

University of Wollongong

Research Online

Faculty of Law, Humanities and the Arts -
Papers (Archive)

Faculty of Arts, Social Sciences & Humanities

1-1-2014

History Foundation to year 12 (in Review of the Australian Curriculum - Supplementary Material)

Gregory Melleuish

University of Wollongong, gmelleui@uow.edu.au

Follow this and additional works at: <https://ro.uow.edu.au/lhapapers>



Part of the [Arts and Humanities Commons](#), and the [Law Commons](#)

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

History Foundation to year 12 (in Review of the Australian Curriculum - Supplementary Material)

Abstract

The Australian history curriculum is compulsory for Years Foundation through to Year 10. It states that its rationale is as follows: 'The curriculum generally takes a world history approach within which the history of Australia is taught.' The curriculum is also defined, and limited, by its three cross-curriculum priorities:

- * Aboriginal and Torres Strait Islander histories and cultures
- * Asia and Australia's engagement with Asia
- * Sustainability.

Keywords

curriculum, supplementary, australian, material, review, history, year, 12, foundation

Disciplines

Arts and Humanities | Law

Publication Details

Melleuish, G. (2014). History Foundation to year 12 (in Review of the Australian Curriculum - Supplementary Material). Canberra ACT: Australian Government.



Australian Government

Review of the Australian Curriculum

Supplementary Material

ISBN 978-1-74361-849-3 [PDF]

ISBN 978-1-74361-850-9 [DOCX]



With the exception of the Commonwealth Coat of Arms, the department's logo, any material protected by a trade mark and where otherwise noted all material presented in this document is provided under a [Creative Commons Attribution 3.0 Australia](http://creativecommons.org/licenses/by/3.0/au/) (<http://creativecommons.org/licenses/by/3.0/au/>) licence.

The details of the relevant licence conditions are available on the Creative Commons website (accessible using the links provided) as is the full legal code for the [CC BY 3.0 AU licence](http://creativecommons.org/licenses/by/3.0/au/legalcode) (<http://creativecommons.org/licenses/by/3.0/au/legalcode>).

Disclaimer

The material contained in this report has been developed by the Review of the Australian Curriculum. The views and opinions expressed in the materials do not necessarily reflect the view of or have the endorsement of the Australian Government or of any Minister, or indicate the Australian Government's commitment to a particular course of action. The Australian Government and the Review of the Australian Curriculum accept no responsibility for the accuracy or completeness of the contents and accept no liability in respect of the material contained in the report.

Comments and inquiries

Further information on the Review of the Australian Curriculum can be found on the [Strengthening the Australian Curriculum](http://www.studentsfirst.gov.au/strengthening-australian-curriculum) website (<http://www.studentsfirst.gov.au/strengthening-australian-curriculum>).

For inquiries please contact:

Review of the Australian Curriculum
Australian Government Department of Education
GPO Box 9880
CANBERRA ACT 2601

Contents

1. English (Foundation to Year 12) – Professor Barry Spurr.....	4
2. English (Foundation to Year 10) – Dr Fiona Mueller	27
3. Mathematics (Foundation to Year 6) – Dr Max Stephens.....	53
4. Mathematics (Years 7 to 12) – Catholic Education Office Melbourne (CEOM), Mathematics Advisory Team	74
5. Science (Foundation to Year 6 and Senior Secondary Physics) – Professor Igor Bray	115
6. Science (Years 7 to 10 and Senior Secondary Biology, Chemistry and Earth and Environmental Science - John Monash Science School	130
7. History (Foundation to Year 12) – Professor Gregory Melleuish.....	173
8. History (Foundation to Year 12) – Mr Clive Logan	192
9. Geography (Foundation to Year 12) – Mr Alan Hill.....	225
10. The Arts (Foundation to Year 10) – Dr John Vallance	236
11. The Arts (Foundation to Year 12) Ms Michele Chigwidden	258
12. Technologies (Foundation to Year 10) – Mr Phil Callil	283
13. Civics and Citizenship (Year 3 to Year 10) – Professor Anne Twomey	320
14. Economics and Business (Year 5 to Year 10) – Professor Tony Makin and Dr Alex Robson	344
15. Health and Physical Education (Foundation to Year 10) – Professor Chris Hickey	354
16. Appendix 1 – Scoping Brief.....	362

1. English (Foundation to Year 12) – Professor Barry Spurr

Executive Summary

This report examines the literature component of the subject area of English, as represented in the Australian Curriculum, with reference to the items specified in the Scoping Brief, and by benchmarking the provisions for literature in English with reference to curricula in California and the United Kingdom, and with some reference to the English curriculum in Singapore.

The key findings of this report are that the Australian Curriculum: English contains some valuable elements (for example, some good detail on poetic forms at various points), but that it is:

1. Insufficiently robust, particularly in the areas of academic rigour, structure and sequencing, detail, clarity and foundational aims, and the values and principles of the discipline, which need to be more clearly represented (for example, literary-historical breadth and depth of coverage).
2. Adequate in various aspects of a balanced curriculum, but deficient in others, and seriously unbalanced in (for example) its apparent bias against the historical and canonical components of the discipline and in the patchy representation of the various forms of literature.
3. Adequate in the provision of choice and flexibility, but insufficiently wide-ranging and lacking detail in terms of the literary-historical range of the discipline, and in sequencing (in such as progressive difficulty in poetry, for instance), and too often diverted from focus on the discipline by the intrusion of extraneous elements (most notably, the cross-curriculum priorities).
4. Satisfactory in the general capabilities and achievement standards, but certain elements (such as memorisation, present in all the overseas benchmarking curricula) are not present at all.
5. In the three points on which all curriculum subjects must be focused - Aboriginal and Torres Strait Island peoples; the Asian region, and sustainability – mandating priorities that could be a distraction from the core work of the curriculum, bearing no direct relation to the educational and disciplinary purposes that the curriculum for the study of literature in English is designed to facilitate and fulfil.
6. Flexible, with regard to different school contexts and stages of schooling, but such flexibility needs to exist within a broader and more secure framework of disciplinary rigour and robustness.
7. Weak in positing arrangements for explicit and implicit assessment, and pedagogical and epistemological characteristics (detail needed on the ways in which poetry, for example, is to be closely read, analysed and discussed, in class and in written assessments).
8. Weak (to the point of totally lacking) in indicating parental involvement and the development of accountability and reporting measures which will lead to effective school community engagement.

9. Found wanting, in various ways related to robustness and balance, rigour, sequencing and development, and comprehensiveness when benchmarked against Californian and UK curricula for literature in English.

In summary, the literature component of the Australian Curriculum for English has some valuable elements, but particularly needs strengthening in the areas of disciplinary rigour and robustness, comprehensiveness and sequencing to make it suitable for use in the schools and to assist in raising educational standards in Australian schools to parity with best practice overseas.

Methodology

As required in Part A, item 1 in the Scoping Brief, an analysis and evaluation of the provisions for literature, from Foundation to Year 12, in the Australian Curriculum for English, will be provided, with particular attention to Literature and with reference to:

- robustness
- balance
- scope for choice and flexibility.

Attention will also be paid to related issues of:

- rigour
- sequencing and development
- comprehensiveness.

As required in Part B, comparisons will be made with two other relevant countries: the United States (in the form of the Californian curriculum) and the United Kingdom – with some reference, also, to Singapore. In the concluding assessment, there will also be reference to items 2 to 7 of Part A of the brief.

To begin, the core concepts of a curriculum for the study of literature in English need to be described in order that the succeeding analysis and review of the adequacy of the proposed Australian Curriculum can be contextualised.

Robustness and rigour

A robust and rigorous curriculum in English from Foundation to Year 12 must, from the beginning, be mindful of its destination. The earliest teaching of literature in English to pupils must set the foundation of what is to be robustly and rigorously developed in the years to come. This will have the result that, by the end of the full experience of schooling, a study of the discipline of English, notable for both its breadth and depth, will have been completed.

For this to be achieved, there has to be agreement about the body and range of work that needs to be covered, with regard to literature, and how pupils will progress through that material in the various stages of schooling – obviously, with a degree of choice and flexibility.

That there is no shortage of literature in English, from the simplest material suitable for children who are beginning to read, through to the most complex literature which the best students in Year 12 can

be challenged by, no-one would disagree. And as much of this breadth of material as possible should be embraced by a robust and rigorous curriculum.

Breadth, however, must be balanced by depth and sustained learning. And it is in this area of selectivity and concentration that problems can arise. While it is true that ‘texts’ are available in various conventionally printed and published forms and that a ‘text’ can be anything and everything that is written down or orally or visually transmitted, including multi-modal texts, this breadth of definition can undermine the necessity – if a robust and rigorous curriculum in literature in the discipline of English is to be achieved – for pupils’ experience of essential and core texts to be prioritised. The pursuit of robustness will be perpetually compromised if no clear understanding emerges from curriculum documents of what is essential for pupils to have read, what time periods are to be critically engaged with, and what types of literature should have been examined by the time they have completed school. This reading can and should be assessed as amounting to a rigorous knowledge of literature in English – including, very importantly, its historical development.

Linked to this, is the necessity for the various forms of expression of literature - poetry, drama, fiction and non-fictional prose - to be equally represented, and in a graded form of progression of difficulty, throughout the curriculum.

As with the challenges presented by the broad definition of what constitutes a ‘text’, an emphasis on pupils as ‘creators’ of texts and a concentration on the development of their creative writing, while (arguably) having a place in a curriculum for literature in English, can be so emphasised as to appear to take a position of equal or even greater importance to the study of other writers’ works.

Creativity in any of the arts is best nurtured, especially in the pre-adult years, by a thorough grounding in what others have achieved – and with recognised distinction - in these fields. The idea of pupils as ‘creators’ of literature in English needs to be kept firmly in check. First and foremost, they need to become informed and enthusiastic readers, viewers and listeners.

Balance and comprehensiveness

Related to robustness and rigour, a balanced curriculum in literature will be articulated with even-handed reference to historical, modern and contemporary texts; to texts equally representing all the forms of literary expression, and the achievement of balance between Australian and world literatures in English.

In relation to the historical study of literature, an over-emphasis on twentieth- and twenty-first-century texts produces an unbalanced curriculum and certainly not a rigorous one, with regard to the discipline at large. The range of study must extend from Middle English lyrics and the works of Chaucer to the present, with acknowledgement and experience also of ancient texts from the classical world and of the Bible – sources that, through the centuries, have had an inestimable influence on the development of literature in English.

From Foundation, pupils need to be introduced to texts that evoke different worlds of imagination from their own everyday experience, as well as those that speak of their present and immediate environment. The requirement of ‘relevance’ to the present day or to pupils’ lives as the litmus test of a text’s suitability – at any point in the curriculum - inhibits that inspiring entrance into

imaginative literary creations that it is one of literature's primary purposes to facilitate and which is at the heart of nurturing young people's literary appreciation and enjoyment, in school and for their lifetimes.

The flavoursome vocabulary of the simplest Medieval lyrics and the inventive conceptions of traditional fairy stories, myths and legends (often with strong ethical and psychological messages, as well, as in Aesop's fables) as well as the nonsense verse of writers like Lewis Carroll and Edward Lear can be savoured by the youngest pupils. In later years, as an accumulating sense of the historical past is developed in literary history, the insights that texts can give into distant, very different worlds (as in Shakespeare's songs and sonnets) should enrich the curriculum in equal measure with texts from recent periods and contemporary life, written in familiar, immediately accessible language. Early on, pupils should learn to appreciate literature as something that is not only yoked to the relevant and immediate present, but which is evocative of perennial ideas, emotions and moral convictions. From the early years of schooling, classics of Australian children's literature must be strongly represented: Ethel Turner's *Seven Little Australians*, *The Silver Brumby* series by Elyne Mitchell and Norman Lindsay's *Magic Pudding*, along with texts that have a similar standing in world literature in English, like Rudyard Kipling's *Jungle Book*, Kenneth Grahame's *The Wind in the Willows* and works by such as AA Milne and the brothers Grimm.

The biblical story of Noah's ark is an obvious example of the kind of text to which the youngest children will be drawn and it can begin their introduction to the 'great code' of literature in English, the Bible, 'the single most important influence in the imaginative tradition of Western literature'¹. Later readings of this and other stories can develop pupils' appreciation of different levels of meaning: literal, metaphorical and allegorical. With that developing knowledge of the Bible as literature (a fertile area of contemporary scholarship in English studies), later-year students can properly appreciate such as Tim Winton's richly-biblical fiction (as in *Cloudstreet*). Without some familiarity with that code, pupils' reading is blinkered (as well as their understanding of Western civilisation, for which the Bible is the foundational text). One of the features of a balanced, robust and rigorous curriculum in literature is recognition of the ways in which present texts have evolved from past texts, including ancient ones.

Another test of a quality curriculum for Australian pupils is a balance between Australian and world literatures in English, especially British literature which has been most influential upon Australian writers. Our literature has not developed (and should not be read) in quarantined Australianness. It always was and remains part of world literature, while having its distinctive preoccupations and characteristics. To appreciate that development and response, a balanced reading of Australian texts requires familiarity with the British tradition, in particular, so that the qualities and concerns of Australian writing can be fully appreciated. Patrick White's *Tree of Man* (the title of which comes from a poem by AE Housman) develops an epic vision of Australian lives and landscape, but it also belongs to world literature and the historical development of the novel from the eighteenth and nineteenth centuries. Kenneth Slessor's poetry of Sydney's street and harbour life derives directly from literary Modernism (initiated, in poetry, in the works of TS Eliot), giving an Australian

¹ Northrop Frye, *The Great Code: The Bible and Literature* (Routledge and Kegan Paul, London, 1982), cover.

distinctiveness of expression, a local habitation and a name, to that global phenomenon. Such Australian works have to be read in the wider context of literary movements and literary history.

Balance must also be achieved, in the literature provisions, between the various forms of literary expression: poetry, drama, fiction and non-fictional prose. For years, poetry – regarded exaggeratedly as the most difficult and inaccessible of literary forms – has been increasingly under-represented in curricula and the classroom, even to the point where many university students of English today report (usually critically) that they studied ‘little or no poetry’ at school. A robust, rigorous and balanced curriculum must actively redress this neglect and ensure that all the forms of literary expression are equally represented, and, what is more, throughout the curriculum.

Sequencing and development

A literature curriculum that is robust, rigorous and balanced must set out the ways in which pupils will develop a comprehensive understanding of the literary tradition in English. In the course of sequencing and development, pupils’ education must focus on three particular aspects:

- the evolution of literary forms
- the works of the great writers in literature in English
- the historical periods of literary history.

In the first case, there must be sustained teaching of the different kinds of poetry (for example), beginning in the early years with lyrical verse and emphasis on oral qualities of rhythm and rhyme, and poetry as a spoken form. Memorisation and recitation, developing pupils from reading poetry as text to assisting them to concentrate on the sounds and accents of poetry (which freedom from the printed word facilitates), are vital and need to be sustained from Foundation to Year 12, with cross-disciplinary engagement with music, whenever possible. Systematically, through the years, pupils must be introduced to all the forms of poetry in English (sonnet, narrative verse, lyrical-stanzaic verse, the elegy, ode, epic and so on), so that by Year 12 all have, to some degree, been covered. And in pursuing this study, there should be a balanced mixture of Australian and other material; of modern and contemporary poetry as well as texts from the Middle English period onwards, with every subsequent century at least represented. At the very least, the major poets in English must be studied, at one point or other, in a robust and rigorous curriculum of literature in English. For example: Chaucer, Shakespeare (as poet), Donne, Milton, Pope, Wordsworth, Keats, Tennyson, Yeats and Eliot.

Similarly, with drama, its different varieties, in tragedy, comedy, romance and historical plays, from Shakespeare (as a recurring presence) to the present will be represented. Again, Australian drama, of the past and the present, will be balanced with dramatic texts from other countries, particularly England and the United States. From *A Midsummer Night’s Dream*, to Bernard Shaw’s *Pygmalion* to Tennessee Williams; from *The Sentimental Bloke*, through *The Summer of the Seventeenth Doll* to David Williamson’s contemporary works, there is no shortage of dramatic material for reading, speaking in class and acting in performance from which to draw and from which to achieve a broad and representative balance of past and present, local and international work which not only enriches the school curriculum for English but nurtures a love of the theatre in adult life.

In fictional prose, the rise of the novel, from the eighteenth century, provides another way of emphasising historical development in the context of literary history. Such texts as Swift's *Gulliver's Travels*, from the eighteenth century, and Eliot's *Silas Marner* in the nineteenth – to give two shorter examples – provide representative texts of their periods. The rich resources of the longer English novel, in the nineteenth century at large are readily accessible and can, in many cases, be complemented in teaching by examining film adaptations. Having established the development of the novel, the novella and short story, into the twentieth century, largely through English texts, the balanced emphasis can then shift to Australian stories and novels, beginning with such as Henry Lawson, whose short stories are classics of the genre. As with poetry, every effort must be made to represent the great writers in the tradition, at one point or other, in a robust and rigorous curriculum of literature in English. For example: Jane Austen, George Eliot, Charles Dickens, Henry James, Thomas Hardy, Joseph Conrad, DH Lawrence, James Joyce (*Dubliners*, for example, for the short-story form), Patrick White, Tim Winton.

In non-fictional prose, the essay should be a special study, integrated with the development of essay-writing. Again, a balance should be achieved across a wide range of prose artistry, including historical writing, reviews, opinion pieces, autobiography and biography, global and Australian material and from across the centuries.

Choice and flexibility

Providing that ample examples are given of the texts that would fulfil the requirements of robustness, rigour, balance, sequencing and development and the ways in which the required comprehensiveness of the curriculum for literature in English can be fulfilled, so that pupils do not arrive at Year 12 with unacceptable lacunae in their knowledge and experience of any of the periods or forms of literature (poetry, drama, fiction and non-fictional prose), choice and flexibility for teachers can be provided and encouraged. The idea of a core curriculum, with options extending it, is essential. For example, the requirement of a study of Romantic poetry could be fulfilled in a choice of one of Blake, Wordsworth, Coleridge, Shelley, Keats and Byron. In a choice of earlier twentieth-century Australian poetry, one of A.D. Hope, Douglas Stewart, Kenneth Slessor, Dorothea Mackellar and Mary Gilmore could be made. Of present-day writers, one of Les Murray, Judith Beveridge, Bruce Dawe and Robert Gray. And so on. What matters is that the periods and forms are comprehensively represented (if not exhaustively studied, which is obviously beyond a school curriculum in English) and that the balance between local and international literatures in English is constantly sustained, so that tendencies to insularity and parochialism and a narrowing over-emphasis on contemporaneity are curtailed.

Comprehensiveness

A comprehensive curriculum for literature in English will exhibit:

- A breadth of historical range that extends from the Middle English period to the present.
- An equal representation of all the forms of literary expression in English (poetry, drama, fiction and non-fictional prose).
- The representation of the recognised great writers from each century of the development of literature in English, from the late Medieval period to the present.
- A balance between literature in English by Australian poets, dramatists, novelists and other prose-writers and works by writers in English from other countries - especially Britain, which has been the main influence on Australian linguistic and literary cultures.

The Australian Curriculum: English – commentary

Rationale and Aims (p. 4)

This important introductory statement makes no reference to the Western tradition of literature in English, while detailing the contribution of Aboriginal and Torres Strait Islander peoples to 'Australian society and to its contemporary literature and its literary heritage', and that the 'Australian Curriculum: English values, respects and explores this contribution'. It is further stated that it 'also emphasises Australia's links to Asia'. But, in terms of literature in English, these links are all but non-existent, while the impact of Aboriginal and Torres Strait Islander peoples on literature in English in Australia has been minimal and is vastly outweighed by the impact of global literature in English, and especially that from Britain, on our literary culture. Why is there no statement here of respect for that contribution and an intention to explore it? That this is simply not mentioned, as if it does not exist, is surprising. The statement of Aims is comprehensive.

Content Structure (p. 5)

The general account of the Literature component here is adequate.

Content descriptions (p. 6)

That the descriptions 'do not prescribe approaches to teaching' is, arguably, acceptable, although this does raise, in part, the large issue of the ways in which the requirements of this or any curriculum are going to be fulfilled in the classroom and how teachers are to be best equipped and assisted in bringing them to fruition, especially if the teachers themselves are not well-prepared in various elements of the curriculum for literature in English (e.g. approaches to teaching poetry in its historical development or drama in performance).

Literature: understanding, appreciating, responding to, analysing and creating literature (pp. 8-9)

The introductory paragraph here puts the appreciation and creation of literary texts on an equal footing of importance, and while 'understanding' is listed in the section's title, it is not prioritised in the following details. Pupils' principal task, as learners in the literature-in-English classroom, is to understand and appreciate literature. Their creativity in creating literary texts is a subordinate

activity and should not be given equal status in this way.² Teachers' main work is to nurture understanding and appreciation of literature, through close reading and interpretation, historical and social contextualisation, and the education of pupils in the evolving forms and structures of literary texts.

While it is encouragingly stated that texts with 'enduring artistic and cultural value are drawn from world and Australian literature', the examples of sources that are then given are Aboriginal and Torres Strait Islander peoples; Asia; from Australia's immigrant cultures, 'and texts of the students' choice'. Bizarrely, the principal source of texts of 'enduring artistic and cultural value' – the tradition of literary expression at the heart of Western civilisation – is omitted. It is not enough for this to be taken for granted. It needs to be affirmed and prioritised.

The bullet points under 'Literature' are a succinct summary of how literary study should be approached.

English across Foundation to Year 12 (p. 11)

Under 'Years 3-6', it is confidently stated that pupils will 'develop an increasingly sophisticated understanding of grammar and language, and are increasingly able to articulate this knowledge'. If this is so, and will be achieved, it will be an astonishing advance (a welcome revolution, indeed) on current curricula in Australian schools. At present, the very best pupils, coming on to university to study English, possess at best a rudimentary knowledge of English grammar, and usually only because they have studied a foreign language at school (such as Latin or French) where grammar was insisted upon and tested. Most undergraduates report that they learnt nothing of English grammar at school (to the point where even identifying the parts of speech in a sentence is beyond them), that their grammatical errors were routinely left uncorrected in their essays (even as late as Year 12) and they continue to reproduce such errors (including elementary mistakes in agreement of nouns and verbs, and in the use of punctuation, for example) in their university essays.

This admirable aspiration in the curriculum raises a fundamental issue: how are teachers who may be themselves untrained and unskilled in grammar (having come from a system in their own schooling where it was not taught) to be educated and supported in achieving the projected 'sophisticated understanding of grammar' in Years 3-6 pupils?

The term 'sophisticated' (with apparent ignorance of its etymology) appears again on page 14 in relation to Literacy, where pupils' 'sophisticated language choices' are referred to, and where their introduction to language use 'in different social contexts' is mentioned. But nowhere does there appear to be any attention paid to the fact that core achievements in literacy depend upon a robust and rigorous, ongoing training in vocabulary, spelling and grammar. That may not sound very 'sophisticated'. But it is the necessary hard work that anyone aspiring to mastery of literacy must undertake, as anyone who has studied a foreign language and achieved competence and confidence in its use will testify.

² Under 'Literacy' (p. 10), 'students' ability to interpret and create texts' also presents equality between interpretation and creativity. But this is a different matter from learning about literature, and a different form of creativity. If literacy is to be fine-tuned, creation of pupils' own texts is as important as their interpretation of other texts, as they develop their literacy skills.

Critical and creative thinking (p. 15)

Again, the equality is affirmed in the section's title and in the claim that pupils will 'generate and evaluate knowledge'. How does a pupil who has no knowledge of a subject, or an area within a subject, 'generate' knowledge about it? And, again, 'the close analysis of texts' is balanced with 'the creation of their own written... texts', as if these activities are of equal value, intellectually and pedagogically. Such repeated emphasis on pupils' creativity is a distraction from their main purpose of being at school – to learn. If their own creativity flourishes as a by-product of that learning, that is all to the good. It should not be raised to equality with it. Nor should teachers be encouraged to think that nurturing this creativity is an equal component of their role as teachers of literature in English.

Personal and social capability (p. 15)

As with the extraordinary claims that are made for this new curriculum with regard to 'sophisticated' use of grammar (see p. 11, above), it is astonishing to read here that the nurturing of 'self-expression' which the curriculum will achieve will produce pupils who are 'effective communicators able to articulate their own opinions and beliefs'. If this is achieved, it will be a commendable advance on the current situation. Never have the best products from the current Australian school system, coming on to university, been less articulate, less confident in oral expression and less able to articulate coherently even simple ideas, concepts and opinions than they are today. And, again, the fundamental question needs to be raised: how are teachers who are themselves untrained and unskilled in oral expression (having come from a school system where – demonstrably - it was not successfully nurtured) to be educated and supported in achieving the projected 'effective communicators' envisaged here?

Intercultural understanding (p. 16)

It is envisaged that pupils, interpreting and analysing 'authors' ideas and positions' will 'learn to question stated and unstated cultural beliefs and assumptions'. Before such questioning takes place, it would be preferable if students came to a mastery of understanding of different belief systems. Only questioning based on sound knowledge has any intellectual value or purpose and coming to that knowledge is probably sufficiently challenging in itself, before presuming to question it. Texts of various kinds and degrees of difficulty could be chosen, at different stages of the curriculum, to illustrate how literature presents and interrogates a variety of belief systems.

Cross-curriculum priorities (p. 16)

It is stated that the curriculum will be 'relevant'. Relevant to what? By what standards and by whom is relevance assessed? If it is supposed that it should be relevant to these three stated 'priorities', then significant problems arise.

The three points on which all curriculum subjects must be focused: Aboriginal and Torres Strait Islanders; the Asian region, and sustainability are potential influences for narrowing and inhibiting the study of literature in English; could be a disabling distraction from the core work of the curriculum and are driven by imposed socio-political concerns that bear little relation to the educational purposes that the curriculum for English, specifically, should be designed to facilitate and fulfil. They are reminiscent of the much-resented Procrustean bed on which the NSW HSC

English curricula have been stretched, with every text having to be related and confined to such as 'Belonging', 'the Journey', 'Change' or, as now, 'Discovery'. How, for instance, in the study of literature, does the essay form relate to these cross-curriculum priorities? Or the sonnet? Or Shakespearean drama? By what means will teachers be equipped to make connections that are in any way intellectually and pedagogically coherent or substantial, when there is no discernible point of contact or influence? Merely paying lip-service to these 'priorities' hardly advances the intended appreciation of their importance and could simply be reduced to tokenism.

It is stated that the priorities will have a 'strong but varying presence depending on their relevance [sic] to the learning area'. What if there is no relevance? Are the priorities to be abandoned then? And, in such cases, how are these sustainable priorities of the curriculum? As a mathematics teacher has observed, 'There is no such thing as Asian physics'.

Asia and Australia's engagement with Asia (p. 17)

It is stated that the curriculum for English gives priority to 'Asia and Australia's engagement with Asia'. How can this be realised in the study of literature in English? What 'rich and engaging contexts' for literary study does this engagement with Asia reveal? No examples are given because they would be hard to find.

Sustainability (pp. 17-18)

Young Australians, here, are urged to 'act in ways that contribute to more sustainable patterns of living'. 'Sustainable' in relation to what, and in what domains? They are then urged to create 'a more ecologically and socially just world through informed action'. How any of this relates to a curriculum for literature in English is impossible to understand. It is concluded that:

The priority of sustainability provides rich and engaging contexts for developing students' abilities in listening, speaking, reading, viewing and writing.

Instructively, no examples are given. And the final sentence (p. 18) maintains that studying literature will promote 'social justice'. Literature is studied to promote learning and knowledge. Whether or not it promotes social justice (however – and by whom and related to which standards - that might be interpreted) may or may not be a by-product of that learning. Such imposed values, vacuously undefined, have no place in a curriculum for the study of literature. Obviously, the study of various writers, through the ages, introduces a range of ideas about social justice. This will alert pupils to its importance as subject matter in literary texts. But this is a different issue from studying the texts because they promote social justice (as it might variously be defined).

Links to other learning areas (p. 19)

The only paragraph that makes any sense here and has any practical application in the teaching of literature in English is that under 'History'.

Foundation Year (pp. 21-5)

It is stated here – and often, later – that 'students engage with a variety of texts for enjoyment'. Certainly, one hopes that pupils will enjoy literary study, but there will also be many texts that they find challenging, difficult and not immediately (or even ultimately) enjoyable, but which are

nonetheless valuable – even imperative, for their education. To prioritise enjoyment in this way suggests that it is the litmus test for studying a text.

The range of literary texts is described, but, as usual, the literature of Western civilisation at large is omitted, while the specific ‘oral narrative traditions of Aboriginal and Torres Strait Islander peoples’ are singled out for mention.

That ‘reciting poetry and rhyming phrases’ is listed is good, but memorising must also be required, so that young pupils are introduced to the importance of learning by heart, to be freed from concentrating on the printed text, and hearing and savouring the sounds of language, especially poetry, with its rhythm, rhyme and often strange and flavoursome words.

Also good is the listing of ‘reading aloud’, identifying rhyme and syllables, and various sounds in words; of poems, chants and songs.

But specific mention, again, of the myths and legends of the Western tradition is needed to balance the priority given here to Aboriginal and Torres Strait Islander storytellers.

It is also good to see a focus on ‘enunciation’ (an Australian speech problem, generally), but there should be mention also of correcting mispronunciation and inaudible speech and so on – not simply encouraging good enunciation. Such tics of contemporary Australian speech as the rising inflection at a sentence’s end, turning a statement into a question, and punctuating every sentence with several uses of the word ‘like’ and the phrases ‘sort of’ and ‘you know’ need to be attended to and quelled as early as possible.

Foundation Year achievement standard (p. 28)

The reference that pupils should read ‘predictable texts with familiar vocabulary and supportive images’ raises some questions. What are ‘supportive images’, for example? Why not some fantastical, unpredictable, confronting texts, too – such as some fairy tales?

Year 1 (p. 29)

The reference here to ‘classic texts’, which is often repeated in the curriculum, is insufficiently defined. Examples are needed, especially as teachers of today who have graduated from university English where the very notion of a ‘classic’ or canonical text has not only been rejected, even denounced, but the texts themselves are often suppressed.

This is one of numerous instances in the curriculum where some examples are badly needed to indicate the kind of work that is being envisaged.

Year 1: Literature (p. 32)

It is good to see ‘traditional European texts’ mentioned and representations of dragons used as an example. The curriculum needs more of this kind of specific detail – not to the extent of providing full reading lists of texts, necessarily, but to give examples of what is being referred to at various points.

Literacy (p. 33)

More is needed here on speaking poetry and on memorisation for freedom of emphasis in rhythm and for taking rhyme to heart.

Year 1 achievement standard (p. 36)

More is needed on the types of texts that pupils will have encountered.

Year 2 (p. 37)

The mistaken emphasis on enjoyment (without the balancing recognition of the challenge of difficulty that postpones enjoyment until mastery is attained) is exaggerated here in the reference to texts ‘in which the primary purpose is to entertain’. Certainly, texts that ‘inform and persuade’ are also mentioned, but more attention needs to be given to literature as challenging, confronting, ethically-strenuous, didactic and so on. Enjoyment of such texts can be achieved, but it is usually a later product of the educational and learning process.

Again, the reference to ‘classic and contemporary world literature’ is too vague to be helpful. What is a classic, in this context?

Language (p. 37)

Why, in identifying examples of different kinds of spoken language are Aboriginal and Torres Strait Islander communities and ‘several Asian cultures’ prioritised and European cultures not even mentioned?

Literature (p. 40)

Why is exploring iconography of Aboriginal and Torres Strait Islander cultures prioritised? The European heritage of iconography is rich and varied. Recognising the characters and themes of the Dreaming stories is singled out for attention. Why is there not at least a balancing reference to recognising the main (and multiple) themes of Western myths and legends, which could be studied for the purposes of comparison and contrast with Dreamtime stories?

Literacy (p. 41)

That different kinds of spoken, non-verbal, written and visual communication from Aboriginal and Torres Strait Islander communities and from several Asian cultures within Australia should be detailed and that there should be no reference to Australia’s origins in Western culture is blatantly exclusivist. The curriculum should be an inclusive document, not excluding, repeatedly, a major component of modern Australian culture and society, and its sources and history.

Year 3 (p. 45)

‘Traditional oral texts’ are mentioned. Some examples should be given.

Literature (p. 47)

Not for the first time, reference is made to reading texts that will make links to ‘students’ own lives’ and, in this case, between their lives and texts from Aboriginal and Torres Strait Islanders which present children. Why aren’t texts mentioned that might establish links between young Australian children’s lives and those from Europe or North America? Why must the linkage be confined to Aboriginal and Torres Strait Islander texts? The curriculum is typically reluctant to give examples of

texts, except when it is requiring texts with those origins. And, more generally, children should be learning that they do not go to texts to find their own lives reflected, but to have them extended by encountering other, perhaps very different lives.

Year 3 achievement standard (p. 52)

It is claimed that by this stage pupils will have experienced a range of language features, images, ideas and information from texts. Yet most of the texts specifically referred to in the Year 3 sections are of Aboriginal and Torres Strait Islander or Asian origin. Western and Australian literatures are almost entirely excluded.

Year 4 (p. 53)

The statement in paragraph four does not sufficiently prioritise what are glancingly referred to as 'classic' texts. The citation here, as elsewhere, reads as a pat afterthought and is so lacking in definition (and any examples) as to be useless.

Literature (p. 56)

The forms of literature need to be specified here: poetry, novel, non-fictional prose, etc.

The emphasis under 'elaborations' on texts' representation of 'human experience in the real world' and 'how do they fit in with what I believe?' over-values the pupils' assessment of the worthiness of texts; compromises the imaginative reach of literature beyond the 'real world' (a clichéd term that is philosophically meaningless) and prioritises this puerile judgement: 'Do I recognise this in my own world?' Literature is not learned about, intelligently read and appreciated because it represents a mirror of the reader's world. We do not go to literature to find ourselves or 'my world' there, nor should pupils be indoctrinated to believe that that is the test of literature's function and worth.

Literature (p. 63)

Here, where a specific literary exercise is described, 'differences in setting and lifestyle between urban and remote Aboriginal and Torres Strait Islander peoples' is cited. Yet no kindred exercises referring to other cultural groups – such as European migrants to Australia and their contribution to the culture are ever mentioned.

This happens again on p. 64 where narrative voice in texts is the focus and Aboriginal and Torres Strait Islander traditions are detailed. Narrative has been used by other literary traditions.

Year 6 (p. 71)

Poetry appears to have fallen out of the curriculum by this point, with just general references to 'texts'.

Year 6 achievement standard (p. 75)

There is no mention here that, by Year 6, pupils will be accumulating a wide appreciation of the literary traditions of Western poetry, novel, drama and non-fictional prose.

Year 7 Literature (p. 78)

Building knowledge of Aboriginal and Torres Strait Islander culture, and literary heritage is cited. Why other traditions are simply not mentioned? And where is poetry, under the ‘elaborations’ here? Fiction and film are mentioned.

Elaborations (p. 79)

It is good that poetry returns here, but lacking is the historical sense of literary development.

Year 7 achievement standard (p. 82)

The aspiration that pupils will have reached an understanding of ‘audience, purpose and context’ is good but insufficiently detailed. A range of texts from historical periods needs to be mentioned and how the contextualisation of them will be communicated in the classroom.

Year 8 (p. 83)

Where are poetry and drama in this statement of aims? They need to be specified; otherwise the aspirations can be focused on the favoured, over-represented form of the modern novel.

Literature (p. 85)

Pupils are to investigate Aboriginal and Torres Strait Islander history and to read texts drawn from contexts that are different from their own. No mention is made of pupils’ own cultural heritage – is it to be ignored and discarded? - And how they might read texts that will inform and enrich their understanding of its history and traditions.

Elaborations (p. 86)

The much-criticised NSW HSC-style focus on a Procrustean topic to which the reading of texts must conform now unhappily emerges with the identification of ‘Country/Place’ as a framework of reading.

Elaborations (p. 87)

Pupils are directed to create and perform scripts for short plays. But where in the curriculum has there been the necessary detailed study of short plays which would make this exercise pedagogically useful?

Year 8 achievement standard (p. 90)

There is no sense, as there should be emerging by now, of a building up of a consciousness of literary history and the evolution of literary forms over the centuries. Sequencing and development of this kind are essential to a robust and rigorous curriculum.

Year 9 (p. 91)

In the third paragraph, ‘create’ is given too much emphasis. Evaluation and discussion should be prior to it.

Elaborations (p. 93)

The failure to give examples of which cultures might be investigated here, makes the recommendation (for pupils to explore ‘literature drawn from cultures and times different from the students’ own’) – which is hardly an ‘elaboration’ – of little use.

Elaborations (p. 94)

Good detail on poetry.

Elaborations (p. 95)

It is good to see such as ‘sonnets’ mentioned here. But earlier and more detailed developing of such formal and technical concentration of learning about poetry is needed.

Elaborations (p. 102)

The requirements here for re-telling and adapting stories would have more credibility if more detail about work to be done on understanding of historical and socio-cultural settings of texts had been provided.

The comment that pupils will determine whether a ‘text possesses universal qualities and remains relevant’ is puerile. Whether a text is ‘relevant’ or not is utterly unimportant and, here, undefined. ‘Relevant’ to what? In all kinds of ways, *Paradise Lost* is not ‘relevant’ to today, but any rigorous and robust curriculum for literature in English would include some representation of it, because it is great poetry. That is its true ‘relevance’ to a curriculum in English literature.

Scope and Sequence: Foundation to Year 6 (pp. 131-8)

These pages of the Curriculum are blighted by the kinds of jargon found elsewhere in the documents, especially ‘relevant’ and, here also on page 132, ‘appropriate metalanguage’. What would inappropriate metalanguage be? Examples are badly needed to explain these concepts. And who is to be the judge (and with reference to which criteria) of what is ‘appropriate’ in the language used to discuss texts?

The sequencing with regard to poetry on page 133 is excellent. More attention is needed, on page 134, to recitation and performance. The reference on page 135 to rehearsing and delivering short presentations should be expanded to refer to a range of texts, including poetry.

The references on page 136 to the aesthetic element in texts is valuable, but there is a risk here, and elsewhere, of quarantining this element, when it should be linked to the other qualities of a text, with regard to the communication of meaning and the use of persuasion and argument.

The Australian Curriculum: English – senior secondary – commentary

Rationale (p. 7)

The emphasis here on pupils developing ‘a sense of themselves, their world and their place in it’ is misplaced. Literature may be read in order to develop a sense of ourselves, but – as importantly – as a way to go beyond ourselves and our world. We do not go to texts to find ourselves there, or a mirror of our experience and world. This is to degrade the imaginative and intellectual experience of reading literature, which broadens our horizons, rather than mirroring them.

Senior secondary English studies (pp. 8-9)

Why is a ‘wide range of fiction and non-fiction’ mentioned here but no reference to poetry and drama? The reference, also, to ‘extracts’ is regrettable. Reading of whole texts should be the norm.

The second bullet point reference to pupils creating their own texts, gives too much emphasis – indicating equality of value – to this, when the reading and studying of texts should be the priority.

Texts (p. 12)

‘An array of material in class’ is too broad and is a licence to include anything and everything.

‘Parts of texts’ is unacceptable. Obviously, in some cases, not whole texts but sections will be read. But this should be rare. Whole texts must be the standard and prioritised and the sustained concentration required for the reading (for example) of a long narrative poem or a many-chaptered novel ought to be encouraged.

Sample text list (pp. 12-13)

These amount to a random grab-bag of authors and texts with no links to any sense of curriculum sequencing or development. To give these texts, without any linkage to the idea of a pupil’s progress through the discipline to senior English is without any disciplinary justification. It is, in each section, a chaotic jumble. (The same comments apply to the text lists on page 81 in the ‘Essential English’ documents).

Representation of cross-curriculum priorities (p. 15)

Highlighting the fact that the ‘senior secondary English curriculum values the histories, cultures, traditions and languages of Aboriginal and Torres Strait Islander peoples, and their central place in contemporary Australian society and culture’ highlights the fact that no such statement is made about Western civilisation and its place in Australian history, culture, language and literature.

No text list is provided to give example of how to support the required choice of texts reflecting ‘sustainability’.

The Australian Curriculum: English – Literature – commentary

Rationale (p. 103)

It is stated that pupils will ‘challenge ideas and interpretations’. Before challenging them, they should be taught to understand them.

Structure of Literature (p. 105)

‘Different ways of reading and creating literary texts’ are too easily equated and given equal validity. Such creating may be a by-product of reading, but reading is essential and should be prioritised. Not all readers are creators. Everyone in senior secondary English is a reader.

Unit 4 (p. 106)

Well expressed.

Sample text list (pp. 108-9)

This sample text list amounts to a random grab-bag of authors and texts with no links to any sense of curriculum sequencing or development. To give these texts, without any linkage to the idea of a pupil’s progress through the discipline to senior English is devoid of disciplinary justification. It is, in each section, a chaotic jumble. (The same comments apply to the text lists previously noted).

Details of Units 1-4 (pp. 112-125)

This is detailed, comprehensive and well-focused, so far as it goes. Where it is unsatisfactory is in the absence of a sense of coming to a conclusion of disciplinary study, based on the preceding ten years' work in English, with specific reference to time periods and texts covered. Accordingly, the text lists given here are inadequate and random, not arising out of any systematic progress and process of sequencing and development, let alone disciplinary robustness and rigour.

Benchmarking

The Californian curriculum is compulsory 'for all students'. The UK National Curriculum is compulsory for all State-funded schools, but Independent schools do not have to follow it. More than 90 per cent of schoolchildren in the UK are in State-funded schools.

California Common Core State Standards (March 2013), English Language Arts and Literacy

About the document: The California Common Core State Standards document describe educational standards about what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school. The California Department of Education helps schools make sure that all students are meeting the standards.

In 2010, more than 40 states adopted the same standards for English and math. These standards are called the Common Core State Standards (CCSS). Having the same standards helps all students get a good education, even if they change schools or move to a different state. Teachers, parents, and education experts designed the CCSS to prepare students for success in college and the workplace'.³

Repeatedly, the document refers to English as a 'discipline' on page 6 of the curriculum documents. This term is never used in the Australian Curriculum. The term indicates that English is a subject with elements and components that need to be mastered, and that mastery requires a disciplined attitude to the subject, indicating something more – and more challenging, for teachers and pupils – than the often repeated idea of 'enjoyment' that the Australian Curriculum prioritises (with the puerile implication that if a text is not enjoyable, it is not worth studying).

'Discipline-specific expertise' is applied to 'reading great classic and contemporary works of literature representative of a variety of periods, cultures, and world views' whereby 'students can vicariously inhabit worlds and have experiences much different from their own'.

This contrasts strikingly with the Australian Curriculum's repeated emphasis on texts that are 'relevant' to pupils' own lives, and the failure of that curriculum to emphasise sufficiently the imaginative nurturing which literary study should facilitate.

Page 10 - 'Note on range and content of student reading'. No statement of this necessary kind is to be found in the Australian Curriculum:

'To build a foundation for college and career readiness, students must read widely and deeply from a broad range of high-quality, increasingly challenging literary and informational texts. Through

³ 'What are the common core standards?' <http://www.cde.ca.gov/re/cc/tl/whatareccss.asp>

extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge.... Students can gain this foundation only where the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to future success’.

The Australian Curriculum for English needs to address the post-school consequences of what is being studied at school and how it is being studied.

Page 28 - Grade 1 students: ‘Memorize and recite poems, rhymes and songs with expression’. The Australian Curriculum makes no reference to memorising of poetry.

Page 46 - Later year students’ texts: ‘Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare’. Foundational U.S. documents are listed (p. 50) for study, from ‘the seventeenth, eighteenth and nineteenth centuries’, and they are to be studied for ‘their themes, purposes, and rhetorical features’. The Australian Curriculum for English makes no reference to foundational Australian documents, to be similarly studied as literary texts.

Reading Standards for Literature 6-12: much more detailed in focus than the Australian Curriculum: ‘analyse how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humour’.

Page 50 - Grades 11-12 students: ‘Analyse the representation of a subject or a key scene in two different artistic mediums, including what is emphasised or absent in each treatment (e.g., Auden’s ‘Musée des Beaux Arts’ and Breughel’s *Landscape with the Fall of Icarus*). Analyse how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).

Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics’.

No references to the Bible as foundational literary source or this kind of detailed example of a literary exercise are given in the Australian Curriculum.

The Californian curriculum specifies the kinds of poetry: ‘Includes classical through contemporary works and the subgenres of narrative poems, lyrical poems, free verse poems, sonnets, odes, ballads, and epics by writers representing a broad range of literary periods and cultures’.

There is insufficient prioritising of this kind in what the Australian Curriculum refers to too vaguely and repeatedly as ‘classic texts’ in its documents.

The national Curriculum in England, 2013, English

About the document: ‘Earlier this year the department published proposals to reform the national curriculum so that it is slimmer, focused on essential subject knowledge and which, especially in the

core subjects of English, mathematics and science, compares favourably with the curriculums taught in the most successful education jurisdictions in the world.

Since then we have conducted a public consultation on those proposals and have given careful consideration to the views of those individuals and organisations that responded. As a result, we have made a number of revisions to the national curriculum framework document and the draft programmes of study'.⁴

Page 2 - An uncompromising statement that 'English has a pre-eminent place in education and in society.... Through reading in particular, pupils have a chance to develop culturally, emotionally, intellectually, socially and spiritually. Literature, especially, plays a key role in such development'. English 'aims to ensure that all pupils... appreciate our rich and varied literary heritage'.

The moral and spiritual dimensions of literary study are nowhere mentioned in the Australian Curriculum.

Page 9 - Relationship between literature and music: never mentioned in the Australian Curriculum

Page 13 - One of the stated aims is to 'appreciate our rich and varied literary heritage'. Australia has also inherited that heritage, as an English-speaking nation, but no such tribute is paid to its importance in the Australian Curriculum: English.

Page 14 - Emphasis is placed on introducing pupils to 'words they would rarely hear or use in everyday speech'. 'Reading... feeds pupils' imagination and opens up a treasure-house of wonder and joy for curious young minds'. The Australian Curriculum, contrariwise, emphasises 'relevance', generally, and to 'students' own lives'.

Page 16 - 'Reading and listening to whole books, not simply extracts'.

Page 21 - Emphasising the integration of literary and linguistic skills: 'Pupils should be encouraged to use drama approaches to understand how to perform plays and poems to support their understanding of the meaning. These activities also provide them with an incentive to find out what expression is required, so feeding into comprehension'.

Page 24 - 'They should be reading widely and frequently, outside as well as in school, for pleasure and information'. Two notes sounded here that are not heard in the Australian Curriculum: an emphasis on reading outside school, as well as in the classroom, and not just for enjoyment, but 'information'.

Page 34 - 'learning a wider range of poetry by heart' and p. 27: 'Pupils will continue 'to build up a repertoire of poems learnt by heart, appreciating these and reciting some'. (Memorisation is never mentioned in the Australian Curriculum.)

⁴ 'Draft national curriculum programmes of study', 10 July 2013, <http://webarchive.nationalarchives.gov.uk/20130904084023/https://www.education.gov.uk/schools/teachingandlearning/curriculum/nationalcurriculum2014/a00220600/draft-national-curriculum-programmes-of-study>

Page 35 - 'Pupils should be taught to recognise themes in what they read, such as the triumph of good over evil'. This fundamental moral dimension of literature is never mentioned in the Australian Curriculum.

Page 36 - Emphasis on reading 'whole books and not just extracts'. This is alluded to in the Australian Curriculum too and is obviously a much-needed trend, generally, to move away from the recent common practice of reading parts of texts.

Page 41 - Emphasis, for the primary years, on pupils being able to 'read aloud a wider range of poetry'. More of this emphasis on poetry as an essentially oral art is needed in the Australian Curriculum. The English curriculum constantly reiterates the categories of literature: 'stories, plays, poetry, non-fiction and textbooks'. This kind of emphasis is needed more in the Australian Curriculum (where, for example, poetry and drama, can sometimes appear to have been overlooked or suppressed).

Page 44 - Reference to the range of oral abilities that need to be nurtured: 'intonation, tone and volume', as well as enunciation. There is specification of major themes of literature, such as 'heroism'. This kind of specificity is lacking in the Australian Curriculum, where vague references to 'classic texts' usually suffices.

Also consulted: English Key Stage 3 (2007), from the National Curriculum, as then mandated (to be replaced by the new National Curriculum, currently being introduced in stages)

Opening statement: 'The importance of English', includes this: 'Looking at the patterns, structures, origins and conventions of English helps pupils understand how language works', neatly bringing together the literary and linguistic aspects of the curriculum, and focusing on literary history, insufficiently emphasised in the Australian Curriculum.

There is reference to 'the great tradition of English literature'; 'continuity and contrast'.

Extensive lists given of pre-twentieth-century texts, and twentieth-century ones, and an emphasis, again, on whole texts: 'the study of texts... should be based on whole texts'.

Also consulted: English Key Stage 4 (2007): Subject content: Reading, from the National Curriculum, as then mandated (to be replaced by the new National Curriculum, currently being introduced in stages) [document not paginated]

This clear statement introduces the document: 'Literature in English is rich and influential. It reflects the experiences of people from many countries and times and contributes to our sense of cultural identity'. No such statement about literature in English is to be found in the Australian Curriculum and the only cultural identity that is ever referred to – and repeatedly – is that of Aboriginal and Torres Strait Islander peoples.

Again, there is an emphasis on 'whole texts' and a precise description of the range of texts, including 'at least one play by Shakespeare', 'works from the 19th, 20th and 21st centuries' and 'poetry since 1789, including representative Romantic poetry'.

More of this kind of literary-historical specificity is needed in the Australian Curriculum – just referring to ‘classic texts’ is insufficient.

The document also emphasises the importance of relating texts ‘to their social and historical contexts and to the literary traditions of which they are a part’. No reference is made in the Australian Curriculum to the sense of literary traditions or literary history.

Then, the English curriculum specifies texts from the literary heritage, naming dozens of writers, covering all the centuries from Chaucer to the present, and from a variety of cultures. Although it is nearly exhaustive, it is not particularly helpful in terms of when and how the various texts are to be integrated into the curriculum. But what is important, in the area of robustness and rigour, is that the texts and authors are at least named. Nothing of this kind is attempted in the Australian Curriculum.

Singapore: Literature in English Teaching Syllabus 2013

About the document: ‘Applicable to Lower and Upper Secondary, and the Express and Normal (Academic) courses’.

Page 20 – There is an emphasis on a wide range of poems in the introductory section on the formal kinds of literature. And this requirement: ‘Excerpts from novels, poems or plays will NOT be used as substitutes for entire texts’.

Singapore: Literature in English, Lower Secondary Teaching Syllabus 2007

Page 12 - ‘Substantial’ whole texts emphasised, with page lengths specified: 100-250 pp. And, under ‘Poetry’, ‘exposing students to at least ten substantial poems (ranging from 15-135 lines in length)’. ‘Close analysis’ of ‘language, structure and elements of poetry’ stressed.

Page 13: ‘Very short poems (such as haikus) may not offer sufficient scope for the development of higher order thinking skills’. There is an emphasis on studying a ‘substantial play, studied in its entirety’.

These kinds of provisions, indicating a robust approach to the discipline, are not sufficiently present in the Australian Curriculum.

Singapore: Literature in English, Teaching Syllabus, Honours (so, for specialised classes)

Page 15 - Importantly sets out the eight periods of literature in English from ‘Chaucer and Middle English’ to ‘Contemporary Literature’. Nowhere does this appear in the Australian Curriculum.

Singapore: Theatre Studies and Drama Teaching Syllabus (so, for specialised classes)

Pages 2-4 - Sets out in detail the wide range of skills that the study will nurture – very detailed.

Conclusions

The preceding material, with the methodology and commentary on the relevant documents, with reference to the Scoping Brief, sets out the grounds on which the following assessment is made.

A. The Australian Curriculum provisions for English, with particular attention to Literature, are:

1. Insufficiently robust, particularly in the areas of academic rigour, structure and sequencing, detail, clarity and foundational aims, and the values and principles of the discipline, which need to be more clearly represented (as indicated in the various lacunae noted above, such as literary-historical breadth and depth of coverage).
2. Adequate in various aspects of a balanced curriculum, but deficient in others, and seriously unbalanced in (for example) its apparent bias against the historical and canonical components of the discipline and in the patchy representation of the various forms of literature.
3. Adequate in the provision of choice and flexibility, but insufficiently wide-ranging and lacking detail in terms of the literary-historical range of the discipline, and in sequencing (in such as progressive difficulty in poetry, for instance), and too often diverted from focus on the discipline by the intrusion of extraneous elements (most notably, the cross-curriculum priorities).
4. Satisfactory in the general capabilities and achievement standards, but these are not as robust as they should be and certain elements (such as memorisation, present in all the overseas bench-marking curricula, and the nurturing of essay-writing skills with reference to great essayists) are not present at all.
5. In the three points on which all curriculum subjects must be focused - Aboriginal and Torres Strait Island peoples; the Asian region, and sustainability – mandating priorities that are a distraction from the core work of the curriculum, being driven by socio-political concerns that bear no direct relation to the educational and disciplinary purposes that the curriculum is designed to facilitate and fulfil.
6. Flexible, with regard to different school contexts and stages of schooling, but such flexibility needs to exist within a broader and more secure framework of disciplinary rigour and robustness.
7. Weak in positing arrangements for explicit and implicit assessment, and pedagogical and epistemological characteristics (detail needed on the ways in which poetry, for example, is to be closely read and analysed and discussed, in class and in written assessments).
8. Weak (to the point of totally lacking) in indicating parental involvement and the development of accountability and reporting measures which will lead to effective school community engagement.
9. Not particularly striking in the areas of encouraging a love of learning, a joy of discovery, and a quest for knowledge and related skills. But these important components of learning are not essential for a curriculum document to describe. They are the responsibility of well-educated, dedicated teachers who are deeply committed to and passionate about their discipline. Even the best curriculum document will fail in these areas if there are not teachers of high quality to bring it to life in the classroom.

B. Recent and current English literature curricula of California, the UK and (in less detail) Singapore were examined in the light of:

- robustness
- balance

with attention also paid to related issues of:

- rigour
- sequencing and development
- comprehensiveness.

As specifically indicated in the preceding benchmarking commentary on these curriculum documents, the Australian Curriculum for literature in English, was found, in various ways, to be wanting.

In summary, the literature component of the Australian Curriculum: English has some valuable elements, but particularly needs strengthening in the areas of disciplinary rigour and robustness, comprehensiveness and sequencing to make it suitable for use in the schools and to assist in raising educational standards in Australian schools to parity with best practice overseas.

Acknowledgements

I am grateful to my colleague at the University of Sydney, Dr Fiona Yardley, for reading sections of this report in draft form and making helpful suggestions.

2. English (Foundation to Year 10) – Dr Fiona Mueller

Executive Summary

This report examines the Australian Curriculum: English from the perspective of two of its three organising strands: Language and Literacy. As part of the evaluation of the robustness, independence and balance of the document, comparison is made with curricula from California, England and Singapore.

The Australian Curriculum: English is a lengthy, complex and sophisticated publication. In comparison to each of the comparison curricula, it is extremely detailed and a full appreciation of its aspirations requires the reader to refer to a vast amount of support material accessible online behind the main document. The comparison curricula – in particular, England and Singapore – are much more succinct in their identification of the aims for students and the expectations of teachers.

With direct relevance to the Language and Literacy strands, four specific aspects of the Australian Curriculum: English were selected for closer examination and comparison with the international curricula. These were:

- acquisition of Standard Australian English (SAE)
- mastery of the English language conventions (grammar, punctuation, spelling)
- use of exemplary texts to model and teach high-quality language usage
- development of research and referencing skills.

The Australian Curriculum: English identifies the acquisition of SAE as the goal, but this receives too little attention throughout the document. To be effective, this goal must be stipulated across all curriculum areas, consciously modelled by teachers, highlighted in all of the support material and given greater status in the publications that underpin the effective implementation of the Australian Curriculum, including the Australian Professional Standards for Teachers, the National Assessment Program – Literacy and Numeracy (NAPLAN) and all associated curriculum and professional development materials used in Australian educational jurisdictions. The comparison curricula are more consistent in this regard.

All of the comparison curricula place a strong emphasis on the mastery of grammar, punctuation and spelling. As demonstrated by the Scope and Sequence Charts included in the Australian Curriculum: English, the English language conventions are addressed in a comprehensive, consistent manner throughout Foundation to Year 10. This is less evident in the senior secondary Curriculum, except for the unit known as English as an Additional Language or Dialect. In relation to developing their students' language skills, the expectations of teachers of Years 11 and 12 students should be as great as those in earlier years. At all stages of learning, teachers across all subjects and all stages of learning should assess their students' language skills (especially in written expression) and ensure that all deficits are remedied. The Australian Curriculum: English stipulates that teachers have the flexibility to do this, but diagnostic and remedial strategies are not clearly built into the stages of learning. The capacity of teachers to identify, explain and model correct usage is unequivocally linked to the effectiveness of the intended curriculum.

The Singapore and California authorities mandate the use of exemplary texts with which teachers can model high-quality language. These are generally divided into ‘informational’ and ‘literary’ texts. This strategy is not as obvious in the Australian Curriculum: English, and the support material recommended to teachers, while rich and varied, does not appear as targeted from the point of view of teaching specifically about language.

Research and citation skills are addressed in the Australian Curriculum: English, but are introduced later and appear less demanding than in the comparison curricula. Such skills need to be practised across all learning areas. In California, the expectations of students in research and referencing are extremely high from the early years of primary school, and sophisticated skills in these areas are linked to academic success in the senior years. Students who perform exceptionally well in international tests of reading literacy are able to draw ideas and evidence from texts and to cite these correctly.

In general, the Language and Literacy strands of the Australian Curriculum: English are regarded as robust, independent and balanced.

Introduction

In early 2014, the Australian Government commissioned a Review of the Australian Curriculum in order to evaluate its robustness, independence and balance. It also aimed to examine the content and development process of the curriculum documentation. The Review, led by Dr Kevin Donnelly and Professor Ken Wiltshire, provides an analysis and benchmarking of the curriculum documentation across ten key learning areas. The Review’s findings are based in part on the contribution of subject specialists whose brief was to consider the structure and content of the material, particularly in comparison with curriculum materials being developed in overseas educational jurisdictions.

Focus of the report

This report examines the intended Australian Curriculum: English, with specific reference to the robustness, balance and flexibility of the Language and Literacy strands in the Australian Curriculum: English (Foundation to Year 10). The successive document, the senior secondary Curriculum: English, is considered with regard to its stated intention to allow students ‘to use, consolidate and expand on what they have learned’ in earlier years.

The Literature strand receives detailed attention in a separate report commissioned to inform the Review of the Australian Curriculum.

The brief of this report also includes the requirement to compare several of the content areas, skills or topics identified in the Australian Curriculum with comparable content contained in the curricula from other educational systems. The areas of focus for this report are as follows:

- acquisition of Standard (Australian) English
- mastery of the English language conventions (grammar, punctuation, spelling)
- use of exemplary texts to model and teach high-quality language usage
- development of research and referencing skills.

The English language curricula selected for comparison are drawn from England, California and Singapore. These education systems are similar to those in Australia in terms of the delivery of compulsory and post-compulsory years of schooling; the starting ages of students at primary school; and the intended provision of a mainstream, national curriculum, published in English. All three of these systems have also undertaken recent, major reviews of their English curricula and have produced new documents within the general timeframe of the development of the Australian Curriculum.

According to an Information Sheet published by the Australian Curriculum, Assessment and Reporting Authority (ACARA) in 2009, 'development of the Foundation to Year 10 Australian Curriculum: English has been informed by key international curriculum documents of other top performing countries in that study [2006 Programme for International Student Assessment (PISA)], including Finland, Hong Kong, Canada (Ontario and British Columbia), New Zealand and Ireland. Other English curriculum documents referred to include those from England, California and Singapore.' Development of the Australian Curriculum also included an International Curriculum Mapping Project completed for ACARA in 2010, in which the Australian Curriculum: English was mapped against two comparison curricula – Ontario (Canada) and New Zealand (Jane, Wilson, & Zbar, 2011).

Singapore's curriculum is a logical benchmarking reference because of that country's consistently high standing in international testing regimes, particularly in mathematics, science and reading. A period of review from 2006 resulted in the publication of a new English curriculum for Singaporean students, known as the English Language Syllabus 2010 Primary and Secondary (Express/Normal [Technical]).

The United Kingdom, like the United States, currently ranks well below the high-achieving education systems, including Singapore, which participates in international testing regimes such as the Programme for International Student Assessment (PISA). The Framework document for The National Curriculum in England, published in July 2013, explains that 'for pupils in Year 2, Year 6 and Year 10, the new English, mathematics and science programmes of study will be introduced from September 2015; and for pupils in Year 11 the programmes of study for these subjects will be introduced from September 2016'.

In the United States, the document known as the California Common Core State Standards: English Language Arts and Literacy in History/Social Studies, Science and Technical Subjects was first published in 2010 and then modified in 2013. In concert with 45 other states, the Californian education authorities have agreed that these Standards should underpin curriculum development and delivery at local levels.

Key characteristics of the Australian Curriculum and the comparison curricula (England, California and Singapore) are identified in the table provided in Appendix A on page 52.

Key features of the comparison curricula

The curriculum documents discussed in this report have some characteristics in common. All place a strong focus on the students' development of English language skills to enable students to understand and use language in a range of contexts and for a range of purposes. All emphasise the need for teachers to be flexible in their response to meeting the needs of any given cohort of students. However, the documents vary considerably in style and tone.

Instructions for teachers

The Australian Curriculum: English begins with a directive that 'teachers use the Australian Curriculum content and achievement standards first to identify current levels of learning and achievement and then to select the most appropriate content (possibly from across several year levels) to teach individual students and/or groups of students' (ACARA, 2014, p. 20).

The California authorities specify that 'While the Standards focus on what is most essential, they do not describe all that can or should be taught. A great deal is left to the discretion of teachers and curriculum developers' (California State Board of Education, 2013, p. 6). In Singapore, the curriculum explains that 'The explicitness of the skills/strategies/attitudes/behaviour (SSAB)/Items and Structures statements as well as the exemplifications (which are not exhaustive), aims to guide teachers as they plan and decide on the scope and combination of SSAB/ Items and Structures to be selected for instruction and assessment for a year level' (Curriculum Planning and Development Division, 2008, p. 7).

England's national curriculum may be seen as the most prescriptive, given the statement that 'Schools are free to choose how they organise their school day, as long as the content of national curriculum programmes of study is taught to all pupils' (Department of Education (UK), 2013, p. 3). This document makes clear distinctions between mandated and optional content, stating that while 'maintained schools are legally required to follow the statutory national curriculum', they are 'also free to include other subjects or topics of their choice in planning and designing their own programme of education' (p. 4).

Of the four comparison curricula, the Singapore document provides the most explicit guidance to teachers. Pedagogy is a key focus of this curriculum, and the clear expectations of teachers are reflected in the style and tone of the document (e.g. Teachers will focus on...), the consistent references to the Principles of EL Teaching and Learning (CLLIPS) and the Teaching Processes (ACoLADE) and the inclusion of an entire section titled The Role of the Language Teacher. The Singaporean material is similar to the even more doctrinaire approach in England, where the programmes of study are divided into sections that begin with the words 'Teachers should' and 'Pupils should be taught to'.

The Australian Curriculum: English does not provide explicit instructions for teachers. Instead, the content descriptions are presented as goals for the student, as shown in a Year 6 content description for Language. The student is to 'Understand the uses of commas to separate clauses' (p. 69). The California Common Core Standards are written in a similar style.

Differentiation in the classroom

A further common feature of the four comparison curricula is the emphasis on differentiated instruction. The documents reveal a shared recognition of the wide range of backgrounds, abilities and interests that learners will bring to school; the Australian Curriculum places the greatest emphasis on diversity, with consistent references to Aboriginal and Torres Strait Islander people and the Asia-Pacific region.

The curricula for Australia and England strongly encourage teachers to be inclusive of children from other language and cultural backgrounds and those with special needs. The curriculum documents from California, Australia and England also highlight the need to cater for students whose achievement places them above or below the standards for their cohort. Similarly, the Singapore curriculum specifies that ‘teaching will be differentiated according to pupils’ needs, abilities and interests’ (p. 11).

Organisation of the content

A major distinction between the Australian Curriculum: English (Foundation to Year 10) and its international counterparts is that the former organises the learning content through three ‘interrelated strands that support students’ growing understanding and use of Standard Australian English (English)’ (p. 5). The strands are Language, Literature and Literacy. According to the Australian Curriculum, ‘each strand contributes to the study of English its own distinctive goals, body of knowledge, history of ideas and interests, and each relates to material worth studying in its own right. Teaching, learning, and assessment programs should balance and integrate the three strands in order to support the development of knowledge, understanding and skills’ (p. 11).

Appendix A of this report (refer to page 52) reveals considerable commonality with the comparison curricula (England, California and Singapore) in relation to the language modes. All of the curricula specify that teachers must focus on the macro-skills of listening, speaking, reading and writing. These are sometimes paired with each other or with additional skills such as representing or viewing. The Australian Curriculum is the only document that does not identify any of the language conventions (i.e. grammar, punctuation, spelling, vocabulary) as separate modes. In this regard, the design of the Australian Curriculum: English is somewhat at odds with the administration of a national testing regime that assesses students on their specific knowledge of grammar, punctuation and spelling.

Length and accessibility of the document(s)

Clearly the longest and most comprehensive of all of the curriculum documents, the Australian Curriculum is arguably also the least succinct. At over 400 pages, the Australian Curriculum: English, designed for students in Foundation to Year 12, is far wordier than any of the curriculum documents used for comparison in this report. A total of 294 pages, not including all of the support material for teachers, is provided in the electronic version of the Australian Curriculum: English (Foundation to Year 10). This is considerably longer than the document written for Years 11-12, the senior secondary Curriculum: English, aspects of which are still under development.

The Australian Curriculum: English (Foundation to Year 10) is lengthy in large measure because it must be read in conjunction with numerous other documents. The inclusion of separate sections

such as the achievement standards, Scope and Sequence Charts, cross-curriculum priorities and Links to the other learning areas add many pages. A very large component comprises the seven General capabilities, which are set out in detail at the end of the document. These are Literacy, Numeracy, Information and communication technology, Critical and creative thinking, Personal and social capability, Ethical understanding and Intercultural understanding. The further requirement to address the three cross-curriculum priorities of Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia and sustainability adds considerable detail to the content.

The curriculum document does not include the annotated Work Sample Portfolios, which sit behind each year group's content descriptions and must be accessed separately. These portfolios contain collections of authentic work from students and give teachers guidance in relation to the achievement standards. For each year level, there are three portfolios illustrating performance at the level of satisfactory, above satisfactory and below satisfactory.

Accessing all of these documents in order to establish their robustness, balance and flexibility is likely to pose challenges for stakeholders, not least those who are unfamiliar with contemporary Australian education policy and practices. This raises inevitable questions about the ease with which teachers, students, parents, employers and others can use and refer to the documents. The current trend towards 'explicit instruction' in Australian education would ideally be reflected in more succinct documentation, but the Australian Curriculum: English is daunting in its size and textual complexity. For example, in contrast to similar sections in the international documents, the Year content descriptions and their accompanying elaborations are so verbose as to risk being unhelpful. This may be seen in the Year 8 Literature strand which stipulates that students should 'recognise, explain and analyse the ways literacy texts draw on readers' knowledge of other texts and enable new understanding and appreciation of aesthetic qualities' (p. 86). Five elaborations are provided to explain this requirement.

A further lack of succinctness is seen in the Foundation to Year 10 year by year descriptions. These precede the year content descriptions, contain considerable overlap and repetition, and follow another section that describes the learning that is supposed to occur across four-year-groupings of the same cohorts.

In contrast, the curriculum writers in England, California and Singapore appear to have opted for succinctness and easy reference, using tables, lists and charts containing minimal text to describe the content and strategies for teaching and learning.

Context

Any reflection on the development of the Australian Curriculum must include consideration of the domestic context in which the work has taken place. The structure, content and aims of a new curriculum reflect the purposeful selection and integration of contemporary ideas and influences. The extent to which the choices made by the curriculum's authors are viewed as pedagogically robust, universally applicable and capable of rapid, effective implementation will always be a matter for discussion across the community.

The context in which the Australian Curriculum is currently being reviewed and implemented is one characterised by intense debate over jurisdictional variations in curriculum content, teacher training, literacy standards and students' preparedness for post-school destinations. A wide range of stakeholders has contributed to the debate.

The Australian Curriculum is being implemented in an educational climate characterised by perceptions of a decline in student performance as measured by international tests. With regard to the most recent international assessment of the reading literacy of 15-year-olds, Australian students achieved 14th position out of the 65 competing countries and/or cities. Notably, the results of the 2012 Programme for International Student Assessment (PISA) show that English is not the *de facto* language of any of the top five performers, although it is important to note that it is one of the four official languages of Singapore (ranked third) and English is the medium of instruction in schools in that country.

In 1995, the National Board of Employment, Education and Training cited an earlier policy paper which concluded that 'All Australians need to have effective literacy in English, not only for their personal benefit and welfare, but also for Australia to reach its social and economic goals' (NBEET, 1995, p. 8). More recently, a study by one of Australia's peak employment organisations included the claim that 'increasing the literacy level of a country by 1 per cent leads to a 2 per cent rise in labour productivity and a 1.5 per cent increase in GDP per head' (Australian Industry Group, 2012, p. 4). Further work in this area has been conducted by the Australian Bureau of Statistics on behalf of the Organisation of Economic Co-operation and Development. The Programme for International Assessment of Adult Competencies (PIAAC) surveyed people aged 16-65 years in the official language of their country of residence. Literacy was defined as 'understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential' (OECD 2012b, p. 20). According to a Productivity Commission report, Australia achieved fourth place in literacy among the participating nations: 14 per cent of the sample population scored at the lowest level and 16 per cent at the highest, meaning that 'the majority of the [Australian] population have literacy skills somewhere in between these levels' (Shomos & Forbes, 2014, p. 14). On the basis of the OECD study and a comprehensive literature review, Shomo and Forbes (p. 44) assert that:

Literacy and numeracy skills are an important component of human capital and higher levels of human capital are linked to better labour market outcomes. People with higher literacy and numeracy skills are, on average, more likely to participate and have higher wages than people with lower skills' (Shomos & Forbes, 2014, p. 44).

It would be unrealistic to dismiss such evidence-based contributions to any debate about the significance of literacy across the curriculum, particularly in the broader context of socio-economic and technological changes and challenges that will confront young Australians as deeply as any other students across the globe. The Australian Curriculum: English rightly highlights the critical role of this strand, and Literacy as a general capability, in supporting students' work across all learning areas and throughout their lives. This imperative is expressed in all of the international curricula.

Given the critical, overarching role of this area of the curriculum, it is essential to consider the links between the intended curriculum, the national testing regime (NAPLAN) and the Australian Professional Standards for Teachers. ACARA, which is responsible for developing the Australian Curriculum, is also the body responsible for the development and delivery of the NAPLAN tests. ACARA is also closely linked to the Australian Institute for Teaching and School Leadership (AITSL), whose Chair is the Deputy Chair at ACARA. AITSL is responsible for the development of the Australian Professional Standards for Teachers; this organisation will therefore lead the implementation of the Australian Curriculum. It is arguable that the interdependence of these key educational organisations and strategies should be carefully considered in any review of the Australian Curriculum, particularly in the earliest phases of implementation. Properly integrated, these organisations and instruments have the capacity to effect extraordinary improvements in the performance of Australian students, particularly in English literacy.

These organisational and bureaucratic linkages are emphasised here because of the pre-eminent status of English across the curriculum, the primacy of 'literacy' as the first of the seven general capabilities, and the official requirement that all teachers in all subject areas take responsibility for reinforcing English literacy.

The Australian Professional Standards for Teachers 'define the work of teachers and make explicit the elements of high-quality, effective teaching in 21st century schools that will improve educational outcomes for students' (AITSL, 2011, p. 2). However, while the Standards 'articulate what teachers are expected to know and be able to do at four career stages: Graduate, Proficient, Highly Accomplished and Lead', there is no mention of the Australian Curriculum.

The Australian Professional Standards for Teachers (AITSL, 2011) provide 'Illustrations of Practice' which model ways in which teachers can demonstrate how they meet the standards at different career stages. These are contained in a separate, complex document that makes no explicit, subject-specific links with the Year content descriptions in the Australian Curriculum. For example, in order to demonstrate capacity in Standard 1 (Know students and how they learn), Standard 2 (Know the content and how to teach it) and Standard 5 (Assess, provide feedback and report on student learning), a teacher aiming for 'Proficient' status could follow the advice given in a video interview about multilingual approaches to teaching and learning. The Focus Areas 'identify the components of quality teaching at each career stage' and 'constitute agreed characteristics of the complex process of teaching; (AITSL 2011, p. 5).

Significantly, the Australian Standards do not identify English as the stand-alone, compulsory subject that underpins all other learning across the curriculum. Although the first sentence in the Rationale for the Australian Curriculum: English asserts that '[t]he study of English is central to the learning and development of all young Australians' (p. 4), the failure of the Standards to refer to the English language generally, and to SAE specifically, arguably undermines most or all of the stated aims of the Australian Curriculum.

With only one rather vague reference to literacy strategies contained in the Standards (AITSL, 2011, p. 11), the absence of clarity and alignment around this key aspect of the curriculum offers an unconvincing start to a new era in Australian school education.

It must also be noted that there is currently no federal or state mechanism designed specifically to measure the capacity of all practising teachers to build students' knowledge and skills in English, nor does any educational jurisdiction anywhere in Australia require teachers across all learning areas to undertake regular, compulsory professional development in English language and literacy.

Consequently, the potential for the intended curriculum to influence professional practices and to ensure multidisciplinary reinforcement of the content of the Language and Literacy strands of the Australian Curriculum: English is limited.

Language and Literacy across the curriculum

Although this assertion remains contested by some, English is the key learning area of the curriculum that services all others. The opening sentence of the Rationale in the Australian Curriculum: English asserts that 'the study of English is central to the learning and development of all young Australians' (p. 4). This key learning area carries the unique and unequivocal responsibility for enabling Australian students to engage with all other areas of the curriculum, to participate in national and international testing programs, to develop as human beings and as citizens and to prepare for life after they leave school. The intended English curriculum therefore demands close and critical examination because of the role of English as both an enabling subject (general capability) and as a key learning area in its own right. The legitimate and high expectations of stakeholders, including families, employers and post-school education and training institutions, demand that it be a succinct, academically rigorous and practical document that can be understood, used and supported by all, regardless of their educational jurisdiction.

However, the relationship between the Language and Literacy strands is complex. Whereas the Language strand teaches students *about* language, the Literacy strand is intended to 'develop students' ability to interpret and create texts with appropriateness, accuracy, confidence, fluency and efficacy for learning in and out of school, and for participating in Australian life more generally' (p. 10).

None of the comparison curricula referred to in this report distinguish 'literacy', which is generally portrayed as a skill, from 'language'. However, the distinction made in the Australian Curriculum: English may ultimately prove to be very helpful to Australian students because of the urgent need to address the legacy of an inconsistent focus on English language and literacy by both state curricula and classroom teachers.

The net effect of creating two separate strands has been to add significant length and complexity to the curriculum documentation. It also makes the application of Literacy as a general capability more challenging because much of the knowledge that is required by teachers in other learning areas is in fact held in the Language strand (see later discussion regarding the Australian Curriculum: History); ideally, teachers will master most or all of this content to meet the expectations of the National Standards and the Australian Curriculum. Given the low base from which many teachers will begin, this seems highly unrealistic.

In the Overview of the general capabilities in the Australian Curriculum, teachers are advised that:

The skills and knowledge taught in the Language and Literacy strands of the Australian Curriculum: English support and contribute to the literacy requirements needed for all learning areas. These skills and knowledge have been used as the basis for constructing the Literacy continuum as it relates to all learning areas of the curriculum (p. 150).

A recent analysis of Australian students' results in the 2012 PISA test of reading literacy concluded that 'the word literacy reflects the focus on broader skills and is used to mean much more than the common meaning of being able to read and write. To answer the PISA 2012 tasks correctly, students had to understand key concepts, use a range of processes in the correct way and apply their knowledge and skills in different situations. Some of the assessment tasks were multiple-choice items, but many required students to construct and write their own answers' (Thomson, De Bortoli, & Buckley, 2012, p. 3). This explanation aligns strongly with the objectives outlined for the Literacy strand in the Australian Curriculum: English (Foundation to Year 10).

A high level of control over written expression reflects a student's understanding of how language works. It means more than simply being able to spell challenging words or to identify sentence boundaries; linguistically competent and confident students demonstrate the capacity to use language in highly sophisticated and grammatically correct ways to achieve specific purposes. These students' literacy skills are so well developed that they can focus on the higher-order requirements of any literacy-oriented task without concerns about the mechanics of the language.

In this regard, it is important to note the explanation provided by the Melbourne Declaration on Educational Goals for Young Australians (the Melbourne Declaration) in relation to literacy:

The Melbourne Declaration on Educational Goals for Young Australians (MCEETYA 2008) recognises literacy as an essential skill for students in becoming successful learners and as a foundation for success in all learning areas. Success in any learning area depends on being able to use the significant, identifiable and distinctive literacy that is important for learning and representative of the content of that learning area.

This goal has been built into the Australian Curriculum, which states that all teachers are 'responsible for teaching the subject-specific literacy of their learning area' and 'need a clear understanding of the literacy demands and opportunities of their learning area.' This is arguably where the greatest challenge for Australian education now lies.

According to the Australian Curriculum,

The Literacy continuum will enable learning area teachers to:

- *Identify the general level of expected language and literacy skills for each year level that they are teaching.*
- *Plan how to teach specific language and literacy knowledge and skills essential to students' understanding of learning area content.*

One key question results from this claim. Will all teachers begin from the premise that ‘literacy-rich situations are a part of learning in all curriculum areas’? With regard to the teaching of Literacy in other learning areas, consideration of the Literacy Capability in the Australian Curriculum: History may be useful.

Students understand that language varies according to context and they develop their ability to use language flexibly. This includes understanding and using the language features of historical texts including topic vocabulary, past tense verbs for recounting events, complex sentences to establish sequential or cause-and-effect relationships, the wide use of adverbs to describe places, people and events, and extended noun groups employing descriptive adjectives.

Neither the Literacy Capability nor the section titled Links to the Other Learning Areas contains specific strategies for teachers in relation to teaching the English language conventions listed above. The Scope and Sequence Charts for Foundation to Year 10 contain no explicit references to the mastery of these language conventions. In Year 1 History, one exemplar has one annotation that refers to language usage: ‘uses a past tense verb, that is, ‘were’, to set events in the past’ (Year 1 Work Sample Portfolio Summary, p. 5). However, a search of the support material provided for teachers, accessed electronically via a Year 1 content description (Develop a narrative about the past ACHH021), provided no obvious guidance on the teaching of the past tense. It could be argued that a teacher of Year 1 would be delivering this content via the Australian Curriculum: English because he/she has responsibility for all aspects of the primary curriculum. Given that Literacy is a general capability, however, this is not a satisfactory assumption.

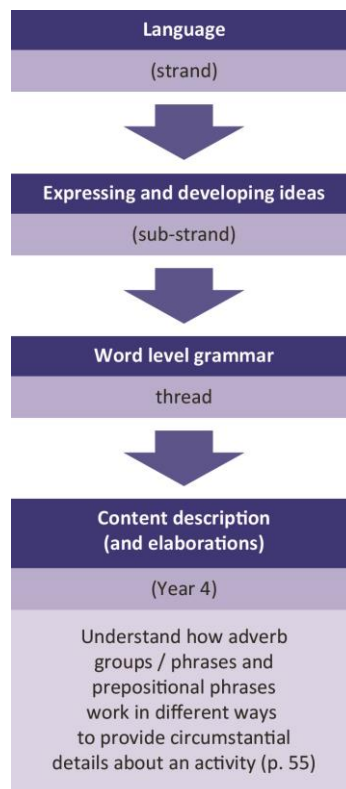
An examination of the Year 8 History Work Sample Portfolios reveals little emphasis on the language conventions mentioned earlier. Although the goal is for students to ‘Sequence historical events, developments and periods (ACHHS148), and Literacy is identified as one of the capabilities relevant to this Historical skill, there is no obvious focus on the use of the past tense. Students are expected to ‘recognise and explain patterns of change and continuity over time’ (Year 8 Work Sample Portfolio, p. 3), but the Annotations do not highlight any of the relevant language conventions listed in the curriculum. To be effective, the curriculum must provide clear instructions regarding the teaching of literacy across the curriculum.

Robustness, balance and scope of the curriculum

On the basis of the breadth and utility of most of the content, the curriculum may be regarded as robust and balanced.

The content of the two strands (Language and Literacy) is outlined in ‘sub-strands’ which form the basis of the Language Scope and Sequence: Foundation to Year 6 and the Literacy Scope and Sequence: Foundation to Year 10. A further level of detail is provided by the ‘threads’ within the ‘sub-strands’.

An example is as follows:



There can be no question of the intention to provide comprehensive and practical content descriptions; every item begins with a verb such as ‘understand’, ‘discuss’ and ‘use’ and content elaborations are provided next to every content description in the main document. The Scope and Sequence Charts enable teachers to identify the learning that should have occurred in earlier years as well as the skills and knowledge to be acquired, the latter having the potential to be incorporated in strategies to cater for more advanced students.

Additionally, the support material for teachers that sits behind the curriculum is impressive in its variety and quantity. To pursue the Year 4 example provided above, for example, the link provided at the relevant content description (ACELA1495) takes the teacher and the student to a sophisticated collection of multimodal materials that explain the application of adverb groups and prepositional phrases. It must be noted that regular, efficient electronic access to these support materials is critical; these resources are the bedrock for classroom activities. They also comprise one of the greatest strengths of the Australian Curriculum: English.

The teaching materials that are accessible online also provide key support for teachers in their incorporation of the seven general capabilities and the three cross-curriculum priorities. The icons and links provide clear guidance regarding the specific capabilities and priorities that are identified by each year content description and/or elaborations. The breadth of this material is impressive.

However, relatively few of the content elaborations that sit alongside the sub-strands seem explicit enough to warrant their inclusion. They would be more effective if reworked to provide practical examples for teachers, both in the English Curriculum and, given the priority of literacy as a general

capability, across all learning areas. For example, one of the most important skills a student can develop is the capacity to proofread an original piece of writing. In the Literacy strand for Year 9, the expectation is to ‘review and edit students’ own and others’ texts to improve clarity and control over content, organisation, paragraphing, sentence structure, vocabulary and audio/visual features (ACEL1747)’ (p. 97). A paragraph showing the correction of common errors, including the use of symbols for proofreading and editing, would be more useful. These are skills that need to be modelled, practised and refined throughout a student’s schooling; teachers, students and families would benefit from easy access to concise, regular examples.

A further question relates to the scope and flexibility of the curriculum. In this regard, a recent review of Australian students’ results in the 2012 PISA tests of reading literacy revealed that ‘Australia’s spread of 318 scores points between the lowest and highest performing students was wider than the OECD average of 310 score points’ (Thomson, De Bortoli, & Buckley, 2012, p. 9). A related issue is thus about the guidance given in the curriculum to teachers to identify and remedy the knowledge and skills deficits of underachieving students. Both national and international test results indicate that Australia has proportionately fewer students achieving at the top levels and a longer ‘tail’ of underachievers. The provision of sophisticated professional development and clear guidance for teachers, together with specific teaching strategies to improve literacy skills, should be seen as a matter of urgency.

The Australian Curriculum: English (Foundation to Year 10) contains broad references to remediation of students’ deficits. The explanation of the way in which the curriculum is organised includes the claim that ‘Learning in English is recursive and cumulative, and builds on concepts, skills and processes developed in earlier years. Nevertheless, the content descriptions have been written to ensure that learning is appropriately ordered and that unnecessary repetition is avoided. However, a concept or skill introduced at one year level may be revisited, strengthened and extended at later years levels as needed’ (p. 6).

In the absence of timely, routine and universal diagnostic testing of all students (the annual NAPLAN tests of reading, writing and language conventions are administered to Years 3, 5, 7 and 9 only), who will ensure that the concepts and skills will be revisited ‘as needed’? The phrase ‘may be revisited’ indicates a high level of flexibility but also a lack of clear direction to teachers to ensure that the knowledge and skills of an incoming cohort are assessed and addressed ‘as needed’.

Similarly, the first paragraph of each Year Description (e.g. Foundation Year, p. 21), ends with the identical statement that ‘Learning in English builds on concepts, skills and processes developed in earlier years, and teachers will revisit, strengthen and develop these as needed.’ Can the reader take this to mean that each teacher will proactively assess each student for knowledge and skills not yet mastered, and address these during the academic year? Is this an expectation? Given that Australian education systems rarely require students in mainstream schools to repeat an academic year, what strategies will guarantee that the needs of underperforming students will in fact be met on a year by year basis?

The Singapore curriculum includes an approach known as ‘spiral progression’, which states that ‘skills, grammatical items, structures and various types of texts will be taught, revised and revisited

to provide the necessary reinforcement’ (p. 11). The curriculum also mandates that Upper Secondary students will ‘use language conventions accurately and effectively at all times’ (p. 87), which places considerable pressure on teachers to identify and remedy language deficits in their students.

A section headed ‘Implications for teaching, assessment and reporting’ (pp. 19-20) in the Foundation to Year 10 curriculum gives some broad guidance in this regard, advising teachers that ‘appropriate adjustments will be made for some students to enable them to access and participate in meaningful learning, and demonstrate their knowledge, understanding and skills across the three English strands.’ According to the curriculum, teachers are to ‘use the achievement standards, at the end of a period of teaching, to make on-balance judgments about the quality of learning demonstrated by the students – that is, whether they have achieved below, at or above the standard.’ Waiting until the end of the academic session to make this judgment seems counterintuitive. Does ‘a period of teaching’ mean one school term? One academic year? Given that the NAPLAN tests are administered and reported on well after the start of the academic year, there is potential for underachieving students to forever become someone else’s problem, with little guarantee of the identification, communication and remediation of their precise learning needs as they move through the system.

Some studies indicate that this has been a particular issue for students transitioning from primary to secondary school, as indeed it may well be for students moving between educational jurisdictions and even between schools in the same district. It must be noted that one of the motivations for introducing a national curriculum is to mitigate this problem. However, an Australia-wide survey funded by the former Commonwealth Department of Education, Science and Training found that ‘Accurate phonics, spelling and grammar are required in most areas of the curriculum, and teachers cannot assume that students entering secondary school will have adequate skills in these areas, so teachers need to be able to give instruction in these skills’ (Milton, Rohl, & House, 2007, p. 19). It is to be hoped that any student beginning in a Foundation class in 2014 will be tracked and supported effectively, but this will depend on many factors.

The Australian Curriculum: English (Foundation to Year 10) has considerable flexibility for teachers to address such issues, but fundamental challenges will remain in relation to teacher capacity, recordkeeping and pedagogic strategies.

Senior Secondary Curriculum: English

The senior secondary Curriculum for English is intended to be integrated into state and territory courses. It contains four discrete subjects (English, Essential English, Literature and English as an Additional Language or Dialect) which share some common features, including a focus on the same language modes of listening, speaking, reading, viewing and writing that are identified in the Foundation to Year 10 documents.

A key difference for senior students lies in the achievement standards, which are organised under two dimensions, as follows:

Dimension 1 - Responding to oral, written and multimodal texts

Dimension 2 - Creating oral, written and multimodal texts

While some texts are suggested for use in each unit, these are ‘intended to stimulate thinking about teaching resources in relation to the content of the curriculum’, meaning that there is considerable flexibility for teachers to incorporate material of their choice. The learning outcomes and content descriptions are reasonably prescriptive and more succinct than those found in the Foundation to Year 10 documents. The three cross-curriculum priorities and the seven general capabilities are expected to be addressed in the senior years of study, so these will be familiar to teachers and students as they work through the curriculum.

It will be important for teachers to make careful judgments about the language skills and deficits of students entering the senior secondary years. One criticism has been that secondary teachers assume knowledge on the part of students and are unwilling or unable to both assess and address their weaknesses, particularly in subjects other than English. Support for students’ language skills, particularly in relation to written expression and grammar, must be a clear focus across all of the units. The capacity of teachers to model increasingly sophisticated usage to students at this stage of their learning is also crucial.

Acquisition of Standard Australian English (SAE)

Both the style and tone of the language used in the Australian Curriculum: English are consistent across the documents. Most material appears to be designed to model Standard (Australian) English.

However, the fact that SAE acquires a strong identity in only one of the four English ‘subjects’ of the senior secondary Curriculum and is not a repeated focus of the Foundation to Year 10 Curriculum, or indeed of the curriculum documents in other learning areas, undermines the stated goals for Language and Literacy. Where is the academic referent in the continuum of learning? There should be a constant reminder of the actual mechanism being used to achieve all of the learning goals – SAE.

The national testing regime requires students to demonstrate mastery of SAE, and the curriculum documents claim that this is a key aspect of preparing students for post-school destinations such as tertiary study and the workplace. The Australian Curriculum: English makes regular and explicit references to other dialects and languages, but a greater focus on SAE as the linguistic ‘home’ to which the Language and Literacy strands belong would reinforce the importance of the acquisition of SAE.

In the Foundation to Year 10 Curriculum, the subject English as an Additional Language or Dialect ‘focuses on language learning and the explicit teaching of the structure, linguistic features and sociolinguistic and socio-cultural aspects of SAE.’ Apart from the glossary, none of the documents emphasises this term.

The Language strand, in which students develop their knowledge of the English language and how it works’, is an extremely wide-ranging area of learning that emphasises the dynamic nature of language and the variations in usage across communities. It is ‘based on concepts drawn largely from historical and linguistic accounts of the English language,’ and allows students ‘to discover the patterns and purposes of English usage, including spelling, grammar and punctuation at the levels of the word, sentence and extended text’.

Under the first sub-strand in the Language strand, a student in the Foundation year is intended to 'Understand that English is one of many languages spoken in Australia and that different languages may be spoken by family, classmates and community' (p. 21). The Year 1 equivalent intends that that learners 'Understand that people use different systems of communication to cater to different needs and purposes and that many people may use sign systems to communicate with others' (p. 29). By Year 9, the student is expected to 'Understand that Standard Australian English is a living language within which the creation and loss of words and the evolution of usage is ongoing' (p. 91).

Such consistent messages about the evolution and variation of English might be seen as dichotomous and even overemphasised, especially given the requirement that students master – and be assessed on – long and detailed lists of specific, contemporary language conventions, as well as the fact that national tests of language conventions do not accept language variations.

The absence of consistent, unequivocal references to the correct use of SAE in the strands, sub-strands and threads is also noted. In contrast, the curricula from England, California and Singapore are consistent in their references to reinforcing students' acquisition and use of Standard English; references to variations in English language usage are rare or non-existent in those documents.

Mastery of the English language conventions (grammar, punctuation, spelling)

The extent to which the three strands of Language, Literature and Literacy are interrelated, which is evidence of the robustness of the Australian Curriculum: English, is demonstrated in another Year 4 content description, for example, as follows: 'Use metalanguage to describe the effects of ideas, text structures and language features of literary texts' (Literature; Responding to Literature, p. 56). At the same year level, through the Language strand, the student is 'creating richer, more specific descriptions through the use of noun groups/phrases, verb groups/phrases and prepositional phrases'.

In the Literacy strand, teachers reinforce this learning with a requirement that students 'reread and edit for meaning by adding, deleting or moving words or word groups to improve content or structure' (p. 58). In Year 3, the Language strand asks that students 'understand that a clause is a unit of grammar usually containing a subject and a verb and that these need to be in agreement' (p. 46). This is a rule that many speakers of other Indo-European languages acquire instinctively, and it is helpful to see it clearly identified using the metalanguage. By Year 9, the Literacy strand stipulates that learners 'Review and edit students' own and others' texts to improve clarity and control over content, organisation, paragraphing, sentence structure [including run-on sentences], vocabulary and audio-visual features' (p. 97). The Scope and Sequence charts reveal a methodical focus on learning about metalanguage, the language conventions and the application of this knowledge to the development of students' receptive skills and to their production of original texts. The provision of a comprehensive glossary is also to be commended.

It is possible that the very low participation rates by Australian students in the study of languages other than English may be compensated for, at least in part, by the deliberate inclusion of the separate strands of Language and Literacy in this curriculum. It is noteworthy that in the first content

elaboration for Foundation students studying the Literacy strand, explicit reference is made to the importance of ‘valuing the ability to speak more than one language’ (p. 21). In England, the national curriculum requires all students to study a ‘modern foreign language’ to the age of 14 (end of Key Stage 3).

The reality, however, which cannot be understated, is that generations of Australian teachers have had little or no formal study of foreign languages, an area of the curriculum that demands a focus on the use of metalanguage and knowledge of the language conventions. These teachers are also likely to be the product of decades of English teaching that contained little or no formal focus on grammar and punctuation. Together, these factors make teachers extremely dependent on an academically robust curriculum and on the support materials that accompany it.

Use of exemplary texts to model and teach language usage

As mentioned earlier, Australian students are ranked lower in international testing than their peers in a number of countries where learning takes place in bilingual or multilingual environments. This is particularly true of reading literacy. Numerous studies, including a range of reports produced in Australia, have pointed to the strong relationship between the acquisition of second and subsequent languages and enhanced cognitive development among young learners (Lo Bianco and Slaughter, 2009).

The curriculum makes few direct references to the identification and consistent use of model texts as exemplars of high-quality writing in SAE. It is appropriate that teachers work with both literary and informational texts at the sentence and word level to highlight the language conventions that must be mastered, particularly if the teachers are not confident about their own writing, proofreading and editing skills.

Some connection between literature and language competence comes in the explanation that ‘Texts are chosen because they are judged to have potential for enriching the lives of students, expanding the scope of their experience, and because they represent effective and interesting features of form and style’ (p. 8). Under the sub-strand ‘Creating literature’, which is defined as ‘us[ing] personal knowledge and literary texts as starting points to create imaginative writing in different forms and genres and for particular audiences’ (p. 8), the Australian Curriculum states that ‘using print, digital and online media, students develop skills that allow them to convey meaning, address significant issues and heighten engagement and impact’ (p. 8). The absence of a consistent and close association between high-quality texts and their explicit use to model the acquisition of SAE is noticeable.

Reading and writing are two of the key language modes developed across the Language and Literacy strands. To have the greatest effect, the texts chosen for reading and research purposes should consist primarily of exemplars of high-quality writing in SAE. One reference to this is found in the year description for Year 3: ‘These texts use complex language features, including varied sentence structures, some unfamiliar vocabulary, a significant number of high-frequency sight words and words that need to be decoded phonically, and a range of punctuation conventions, as well as illustrations and diagrams that both support and extend the printed text’ (p. 45). One Language sub-strand proposes that students *recognise* ‘both grammatically accurate and inaccurate usage of the

apostrophe in everyday texts such as signs in the community and newspaper advertisements’ (p. 46). However, explicit learning about SAE through the selection of high-quality texts is not highlighted. Rather, there is almost total reliance on the use of the students’ own work and on peer assessment to identify common errors and linguistic anomalies.

In contrast, the Singapore authorities explain their strategies as follows: ‘At all levels, teachers will provide pupils with a wide variety of authentic and exemplary reading texts that provide the required content and language input (e.g. grammar, vocabulary, organisational structures) for writing and representing. It is through the explicit teaching and modelling of language use in texts that teachers help pupils internalise the linguistic and organisational structures found in the model texts’ (p. 51).

Development of research and referencing skills

The students who achieve the highest scores in the PISA reading literacy tasks are those who are able to ‘make multiple inferences, comparisons and contrasts; demonstrate a full and detailed understanding of one or more texts; integrate information from more than one text; and deal with unfamiliar ideas in the presence of prominent competing information’ (Thomson, De Bortoli, & Buckley, 2012, p. 15). Learning to locate, apply and reference material in support of claims made in a writing task is a sophisticated skill. Competence in the evaluation of electronic sources is an aspect of this, but students need to draw on their own knowledge and skills to read, reflect and respond effectively.

These skills receive a simple focus in the Year 2 Literature strand, for example, when students begin to ‘discuss the characters and settings of different texts and explore how language is used to present these features in different ways’ (p. 40). As an example of the interrelated nature of the strands, the Literacy strand asks Year 2 students to ‘listen for specific purposes and information, including instructions, and extend students’ own and others’ ideas in discussions’ (p. 41). By Year 10, the Language strand mandates that students should ‘understand conventions for citing others, and how to reference these in different ways’ (p. 100).

These skills are addressed most explicitly in the first of the four English subjects (English, Essential English, Literature and English as an Additional Language or Dialect) which comprise the senior secondary Curriculum. The approach is consistent and clear throughout the four units within subject English. Unit 1 identifies ‘using appropriate quotation and referencing protocols’ as a learning outcome for creating texts. Unit 2 identifies ‘selecting and applying appropriate textual evidence to support arguments, Unit 3 refers to ‘using appropriate referencing; for example, footnotes, in-line citations and reference lists’ and Unit 4 describes the need for ‘substantiating and justifying their own responses using textual evidence’. The emphasis is different in the other subjects but there is, nevertheless, a requirement in each for students to assess the merits of reading material to support their arguments. This builds on the Literacy sub-strand of ‘Interpreting, analysing, evaluating’, on which these students will have been assessed in Year 10.

England – a comparison curriculum

Under the overarching title of National curriculum in England, the curriculum for Years 1 to 6 is delivered through the English programmes of study: Key Stages 1 and 2. The curriculum for students in Years 7-9 (aged 11-14) is set out in the English programmes of study: Key Stage 3. The curriculum for the higher years is under development. The documents produced to date are considerably shorter than the Australian Curriculum; they are also far more prescriptive in their tone. This makes the expectations very clear, and teachers are able to make a clear distinction between the statutory content and their own choice of material.

A common introductory stem for content statements is 'Pupils should be taught to...'. The overall succinctness of the curriculum document is illustrated by the instruction to teachers of Year 1 that:

'Pupils should be taught to:

- *Spell:*
 - *Words containing each of the 40+ phonemes already taught*
 - *Common exception words*
 - *The days of the week' (p. 21)*

The National curriculum in England is similar to the Australian Curriculum: English in the provision of a year description ahead of the content descriptions. The content descriptions are arranged in short tables under the language modes, identifying statutory and non-statutory sections.

Statutory requirements addressing the language conventions for Key Stages 1 and 2 are set out in an appendix to the England curriculum, with a covering statement that 'It is very important, therefore, that content in earlier years be revisited in subsequent years to consolidate knowledge and build on pupils' understanding' (Department of Education (UK), p. 1) The Key Stage 3 document advises teachers in England that they should 'build on the knowledge and skills that pupils have been taught at Key Stage 2. Decisions about progression should be based on the security of pupils' linguistic knowledge, skills and understanding and their readiness to progress to the next stage' (p. 3). With regard to the scope and flexibility of the curriculum, teachers in England are also told that 'They should plan stretching work for pupils whose attainment is significantly above the expected standard. They have an even greater obligation to plan lessons for pupils who have low levels of prior attainment ...' (p. 8).

Acquisition of Standard English

The national curriculum in England places a strong emphasis on Standard English as the linguistic target. This focus is evident in the content, such as in the statements that 'Pupils should be taught to control their speaking and writing consciously and to use Standard English' (p. 5) and 'pupils should begin to use some of the distinctive features of Standard English in their writing (p. 15).

Mastery of the English language conventions (grammar, punctuation, spelling)

The pre-eminence of the English language conventions in the curriculum is demonstrated by their listing among the language modes – spoken language, reading, writing, spelling, vocabulary, grammar and punctuation. The prescriptive tone of the English programmes of study: Key Stages 1 and 2 is reflected in the statement that 'It is important that pupils learn the correct grammatical

terms in English and that these are integrated within teaching’ (p. 5). Teachers of Years 3 and 4 are advised that ‘Grammar should be taught explicitly...’ (p. 30). The content to be covered in these language modes is provided in two statutory appendices attached to the main document. The curriculum suggests that from Year 1 ‘pupils should be taught to use the grammatical terminology in English Appendix 2 in discussing their writing’ (p. 15). There is also a strong focus on the mastery of ‘exception words’, referred to in Australia as ‘sight words’, which require students to learn phonically irregular sounds and their associated spelling.

Selection and use of exemplary texts to model high-quality language

The English programmes of study: Key Stages 1 and 2 place a high value on the choice of texts, stating that the ‘quality and variety of language that pupils hear and speak are vital for developing their vocabulary and grammar and their understanding for reading and writing’ (p. 3). Similarly, the curriculum refers to the use of ‘high-quality books’ and emphasises the use of ‘whole books, not simply extracts’ (p. 21). The English documents emphasise the importance of ‘continuing to read and discuss an increasingly wide range of fiction, poetry, plays, non-fiction and reference books or textbooks’ (p. 33). Where the Australian Curriculum stresses the use and construction of multimodal texts, this is not a focus of the material published in the three key stages examined in this report.

Development of research and referencing skills

By Year 3, students in England are to ‘retrieve and record information from non-fiction’ (p. 26) and by Years 5 and 6, the expectation is that students will ‘retrieve, record and present information from non-fiction’ and ‘provide reasoned justifications for their views’ (p. 34). The expectations of students in this area are generally aligned with those of the Australian Curriculum: English (Foundation to Year 10).

California – a comparison curriculum

The overarching focus of the California Common Core Standards is on making students ‘Career and College-ready’ (p. 3). This is a stronger, clearer and more concise statement of intent than that found in any of the other curriculum documents. Readiness for the post-school world is a constant theme. California’s Standards are well organised and much shorter; this document emphasises that it is not prescriptive and gives teachers maximum flexibility to design courses that suit their students. This flexibility is encapsulated in the statement that while the intention is to ‘facilitate a comprehensive, school-wide literacy program the aim of the Standards is to articulate the fundamentals, not to set out an exhaustive list or a set of restrictions that limits what can be taught beyond what is specified herein’ (p. 5).

Focus on the acquisition of Standard English

The California document has been specifically written to support literacy and language in a ‘shared interdisciplinary’ manner and refers repeatedly to the acquisition of Standard English (not Standard American English) as the goal.

Mastery of the English language conventions (grammar, punctuation, spelling)

The Common Core Standards ‘insist that instruction in reading, writing, speaking, listening and language be a shared responsibility within the school’ (p. 3). As one of the five identified modes, language occupies a distinctive place. Under the heading Key Features of the Standards, teachers are

advised that ‘the Language standards include the essential rules of standard written and spoken English’ (p. 7). Like the national curriculum in England, the California Standards include appendices containing supplementary material, a glossary of terms and exemplars.

Selection and use of exemplary texts to model high-quality language

The focus is on ‘complex informational texts’ which individuals will need to be able to read and respond to ‘in a variety of content areas’ (p. 3). The reading mode identifies the critical contribution of both ‘literary’ and ‘informational’ texts.

Development of research and referencing skills

A very high value is placed on the development of knowledge and skills in this area of the curriculum; it appears to be of greater importance here than in any of the other comparison curricula. Building students’ capacity to use extracts from a range of media with a demonstrated commitment to academic honesty and to critical thinking and reasoning begins very early in Californian schools.

The California Common Core State Standards make the strongest possible connection between reading and writing skills and students’ capacity to use a range of sources to support reasoning and claims. Under the heading Research to Build and Present Knowledge, this focus area commences in Year 4. Students are required to learn to evaluate and select relevant print and digital sources and carefully acknowledge these sources. They learn about the integration of quotations and the use of paraphrased material in written work and the generation of an accurate bibliography (pp. 22-24).

The Common Core Standards make clear links with Text Types and Purposes. Year 4 students, for example, are required to ‘develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic’ (p. 23). Year 5 students are required to ‘recall relevant information...gather information from print and digital sources; summarise or paraphrase information in notes and finished work, and provide a list of sources.’ (p. 24) Year 6 students ‘gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions or others while avoiding plagiarism and providing basic bibliographic information for sources’ (p. 59). In the following year, the standards require further practice in the same competencies but by this time students ‘are following a standard format for citation’. This requires teachers to model good practice early, and to ensure that the exemplars used (‘informational texts’) are accessible to this age group. Additionally, the relevant technology (Microsoft Word tool) can easily be used to support the development of these skills.

As part of the content included under the heading Research to Build and Present Knowledge, assessed within the Writing Standards, Grade 3 students are asked to demonstrate that they can ‘take brief notes on sources and sort evidence into provided categories’ (p. 24). By Grade 6, students are expected to ‘trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not’ (p. 60). Grade 8 students will need to ‘delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; [and] recognise when irrelevant evidence is introduced’ (p. 60). By Grade 10, students should be able to ‘gather information from multiple authoritative print and digital sources, using advanced searches effectively; assess the

usefulness of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation including footnotes and endnotes' (p. 64). The only difference in the senior secondary years is that Grade 11 and 12 students are to make judgements based on the 'strengths and limitations' of the sources.

Singapore – a comparison curriculum

The Guiding Principles of Singapore's English Language Syllabus 2010 Primary (Foundation) and Secondary (Express/Normal [Technical]) include the statement that 'Bilingualism is a cornerstone of our education system. Pupils learn both English and their Mother Tongue language in school...'. Although Malay is the national language, English is one of the four official languages and is the common language used for business and government and for instruction in schools.

Teachers are explicitly guided on 'What to teach, When and Why' and these sections of the curriculum documents contain detailed instructions to teachers about the delivery of subject content. In a similar manner to the national curriculum in England, each instruction includes the words 'teachers will...'

This curriculum document uses tightly constructed tables and charts to describe the content. Content is organised under the headings of Focus Areas, Learning Outcomes and Skills, Strategies, Attitudes and Behaviours. Most examples are provided in short lists.

Focus on the acquisition of Standard English

The Singapore curriculum emphasises the teaching of 'internationally acceptable English' (p. 7). According to the curriculum documents, 'Singapore's transformation into a knowledge-based economy, the rapid developments in technology, the generational shift in home language and an increasingly competitive international environment are some factors that make proficiency in English necessary for pupils' (p. 6). The Singapore curriculum advises teachers about the need to motivate students through constant encouragement and praise, specifically recognising the fact that some pupils 'lack confidence in applying writing and representing skills competently.'

Mastery of the English language conventions (grammar, punctuation, spelling)

The Areas of Language Learning are the same as those in the Australian Curriculum – listening, speaking, reading, writing and viewing. An additional area of learning is 'representing', which is closely linked to the other modes.

In Singapore, teachers are advised to spend considerable time modelling proofreading and editing strategies. This should be done 'by editing work with the whole class' and by providing an editing checklist 'as a guide for pupils to determine what they should look out for', which should be devised based on the knowledge of pupils' 'common errors'. Teachers should cater for 'more able pupils' by enabling them to 'engage in peer editing for grammar, spelling, punctuation, overall expression, register and the use of conventions such as abbreviations and the use of numerical forms' (p. 51).

Selection and use of exemplary texts to model high-quality language

The Singapore curriculum gives literature the responsibility of providing ‘exemplary texts’ as models for students who are learning to write. Under Writing and Representing Skills and Strategies, for example, teachers are advised that ‘At all levels, teachers will provide students with a wide variety of authentic and exemplary reading texts that provide the required content and language input (e.g. grammar, vocabulary, organisational structures) for writing and representing. It is through the explicit teaching and modelling of language use in texts that teachers help pupils internalise the linguistic and organisational structures found in the model texts’ (p. 51). Teachers are also told to revisit the explicit teaching of metalanguage at different year levels, with the specific metalanguage provided for this purpose.

Development of research and referencing skills

The learning in this area of the curriculum is carefully sequenced. By upper primary level, students are required to use both literary and informational/functional texts to demonstrate receptive and productive skills. In the lower secondary years, they ‘apply close and critical reading and/or viewing skills to comprehend and respond’ (p. 87) and in the upper secondary years, they are expected to be able to ‘consolidate information from various sources for planning, speaking, writing, and/or representing ideas and thoughts coherently for creative, personal, academic and functional purposes’ (p. 87).

Bibliography

- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2010). *Writing - Narrative Marking Guide*. Sydney: ACARA.
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2009). The Australian Curriculum: Information Sheet. Sydney, NSW, Australia: ACARA. Retrieved May 27, 2009, from www.australiancurriculum.edu.au
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2011, December). *English: Work Sample Portfolios*. Retrieved January 21, 2012, from ACARA: www.acara.edu.au
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2011). *General Capabilities (Consultation Report)*. Australian Curriculum, Assessment and Reporting Authority, Sydney. Retrieved 21 January, 2014, from www.acara.edu.au
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2013). *General Capabilities in the Australian Curriculum*. Sydney: Australian Curriculum, Assessment and Reporting Authority (ACARA). Retrieved May 22, 2014, from <http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Literacy>
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2014). *English across Foundation to Year 12*. Retrieved May 23, 2014, from Australian Curriculum: <http://www.australiancurriculum.edu.au/english/english-across-foundation-to-year-12>
- ACARA (Australian Curriculum, Assessment and Reporting Authority). (2014). *The Australian Curriculum*. Retrieved January 21, 2012, from ACARA: www.acara.edu.au
- ACARA (Australian Curriculum, Reporting and Assessment Authority). (2014, June 2). *Australian Curriculum: History*. Retrieved May 13, 2014, from <http://www.australiancurriculum.edu.au/humanitiesandsocialsciences/history/general-capabilities>
- AITSL (Australian Institute for Teaching and School Leadership). (2011). *Australian Professional Standards for Teachers*. Melbourne, Victoria, Australia: Education Services Australia. Retrieved Oct 10, 2012
- Australian Industry Group. (2012). *When Words Fail (National Workforce Literacy Project - Final Project Report)*. Sydney: The Australian Industry Group. Retrieved 2013 йил 6-March from www.aigroup.com.au
- California State Board of Education. (2013 March). *California Common Core State Standards*. Retrieved 2014 1-May
- Choules, K., and Lyons, D. (2007). *Improving written English through a reflective practice approach*. Australian Association for Research in Education (AARE). Canberra: AARE. From <http://www.aare.edu.au/publications-database.php/5338/improving-written-english-through-a-reflective-practice-approach>
- Curriculum Planning and Development Division. (2008 October). *English Language Syllabus 2010*. Singapore: Ministry of Education, Singapore.
- Department of Education (UK). (2013 September). *English Appendix 1: Spelling*.
- Department of Education (UK). (2013 September). *English Appendix 2: Vocabulary, grammar and punctuation*. 1. Department of Education.
- Department of Education (UK). (2013 September). *English programmes of study: Key Stage 3 (National Curriculum in England)*.
- Department of Education (UK). (2013 September). *English programmes of study: Key Stages 1 and 2 (National Curriculum in England)*. Retrieved 2014 3-May
- Department of Education (UK). (2013 July). *The national curriculum in England: Framework document*.
- Derewianka, B. (n.d.). *Pathways Up and Down the Strands*. Wollongong: University of Wollongong.

- Eunson, B. (2008). Literature, Literacy, Language - Osmosis, False Dilemmas and Some Solutions. *Symposium: A National Curriculum in English: Perspectives, Principles, Possibilities*. Sydney: University of Sydney.
- Jane, G., Wilson, B., and Zbar, V. (2011). *Curriculum Mapping Project (Comparing International Curricula against the Australian Curriculum - Final Report)*. Melbourne: Laulon Management, Education and Technology Solutions.
- Jones, P. T., and Chen, H. (2012). Teachers' knowledge about language: issues of pedagogy and expertise. *Australian Journal of Language and Literacy*, 35(2), 147-168.
- Lo Bianco, J., and Slaughter, Y. (2009). Second Languages and Australian Schooling. *Australian Education Review*, 54. Retrieved 2014 10-May from http://www.acer.edu.au/documents/AER_54-SecondLanguagesAndAustralianSchooling.pdf
- Martello, J. (2001 June). Talk about writing: metalinguistic awareness in beginning writers. *Australian Journal of Language and Literacy*, 24(2), 101-111.
- MCEETYA (Ministerial Council on Education, Employment, Training and Youth Affairs) (MCEETYA). (2008). Melbourne Declaration on Educational Goals for Young Australians. Retrieved April 22, 2014, from www.curriculum.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals
- Milton, M., Rohl, M., and House, H. (2007). Secondary Beginning Teachers' Preparedness to Teach Literacy and Numeracy. *Australian Journal of Teacher Education*, 32(2), Article 4. From <http://ajte.education.ecu.edu.au/issues/PDF/322/Milton.pdf>
- NBEET (National Board of Employment, Education and Training). (1995). *Teacher Education in English Language and Literacy*. Australian Language and Literacy Council. Canberra: Australian Government Publishing Service.
- OECD (Organisation for Economic Co-operation and Development). (2012). *Literacy, Numeracy and Problem Solving in Technology-Rich Environments: Framework for the OECD Survey of Adult Skills*. Paris: OECD Publishing.
- Shomos, A., and Forbes, M. (2014). *Literacy and Numeracy Skills and Labour Market Outcomes in Australia (Productivity Commission Staff Working Paper)*. Productivity Commission. Canberra: Australian Government.
- Thomson, S., De Bortoli, L., and Buckley, S. (2012). *PISA 2012: How Australia Measures Up (The PISA 2012 assessment of students' reading literacy)*. Melbourne: Australian Council for Educational Research. From <http://www.acer.edu.au/documents/PISA-2012-In-Brief.pdf>

Appendix A: Characteristics of the comparison curricula

	AUSTRALIA	ENGLAND	CALIFORNIA	SINGAPORE
Key dates	Full implementation from 2014	Implementation from 2014	Adopted in 2010; modified in 2013	Secondary implementation from 2010; primary from 2013
Title and length of main curriculum document for English learning area	The Australian Curriculum: English (Foundation to Year 10) - 294 pages The Australian Curriculum: English (senior secondary) – 135 pages	English programmes of study: Key Stages 1 and 2 (ages 5-11) – 38 pages English programmes of study: Key Stage 3 (ages 11-14) – 25 pages	Common Core Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (K-5 and 6-12) – 89 pages	English Language Syllabus 2010: Primary (Foundation) and Secondary (Normal [Technical]) – 110 pages
Overarching aims	Foundation to Year 10 - 'developing the understanding, attitudes and capabilities of those who will take responsibility for Australia's future...contributes to nation-building and to internationalisation...helps students to engage imaginatively and critically with literature to expand the scope of their experience...emphasises Australia's links to Asia.' Senior secondary – 'developing students' analytical, creative and critical thinking and communication skills in all language modes.'	'... promote high standards of literacy by equipping pupils with a strong command of the written and spoken word, and to develop their love of literature through widespread reading for enjoyment.'	Career and College-readiness	'developing proficiency in English for everyday situations and functional purposes... participate in a knowledge-based economy where English is the lingua franca.'
Cohorts	Foundation to Year 10 Years 11-12	Years 1-6 and 7-9 (Years 10-11 in progress)	Kindergarten to Year 12	Primary Secondary
Overarching organisation / curriculum structure	Foundation to Year 10: Language, Literacy and Literature Senior secondary: English, Essential English, English as an Additional Language or Dialect, Literature (four discrete 'subjects')	English programmes of study: Key Stages 1 and 2 English programmes of study: Key Stage 3 Appendices detailing statutory and non-statutory requirements	K-5 English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects Standards for English Language Arts 6-12 Literacy in History/Social Studies, Science, and Technical Subjects 6-12	Guiding Principles <ul style="list-style-type: none"> • Areas of Language Learning • Role of the Language Teacher
Language modes	Listening, speaking, reading, writing, viewing	Spoken language, reading, writing, spelling, vocabulary, grammar, punctuation	Reading, Writing, Speaking and Listening, Language	Listening, reading, viewing, speaking, writing, representing, grammar, vocabulary

3. Mathematics (Foundation to Year 6) – Dr Max Stephens

Executive Summary

Robustness, balance and flexibility

Several features of the Australian Curriculum: Mathematics contribute to its robustness, balance and flexibility. Most pertinent are its clear content descriptions across three clearly defined content areas. Four Mathematical Proficiencies – understanding, fluency, problem solving and mathematical reasoning – play an essential role in assisting teachers to strike an appropriate balance between what is taught and students’ mathematical development. Seven general capabilities are also included to ensure that mathematics is not taught in isolation from literacy, information and communications technology (ICT) capability, critical and creative thinking and other capacities essential for success in school and in lifelong learning. They are also essential for whole-year and whole-school planning. Their inclusion in the Australian Curriculum: Mathematics is flexible and unobtrusive. Achievement standards are concise, teacher friendly, and carefully worded to emphasise that depth of understanding and progressive development of skills are needed before students are ready to move to the next level.

Content elaborations

These serve an important purpose, and are generally effective. However, their quality and clarity are uneven. Content elaborations are most effective when they draw attention to some key mathematical features of the content. The majority of elaborations do this well. However, elaborations are less effective when they simply paraphrase a content description or suggest a teaching context. Elaborations are also less effective when they introduce ideas that are conceptually challenging, such as in Year 4 ‘explaining why the probability of a new baby being either a boy or a girl does not depend on the sex of the previous baby’.

The mathematical focus of the content elaborations needs to be more consistent. They should only present examples, contexts and illustrations which are necessary to convey an important aspect of the mathematics to be learned. They have an important role to play in alerting teachers to where some key mathematical ideas need to be introduced in order to lay foundations for future learning, and where these same ideas are to be treated in depth. However, it can be argued that their format in the Australian Curriculum: Mathematics – restricted usually to several brief lines of text, with little scope to include mathematical symbols or diagrams – imposes limitations on their effectiveness.

Mathematical proficiencies and general capabilities

The Australian Curriculum: Mathematics’ four proficiencies draw attention to what it means for students to think and act mathematically, and to the complementary relationships between fluency and understanding, and how these contribute to problem solving and reasoning.

Especially in the primary years, the general capabilities of the Australian Curriculum: Mathematics serve an important role in drawing attention to the interrelationships between what is learned (i.e. content descriptions) in mathematics and how this should support students’ overall development in

literacy, numeracy, ICT capability and so on through whole-school planning. They also draw attention to how mathematics should be seen as fostering critical and creative thinking and other capacities essential for success in school and in lifelong learning. The Australian Curriculum: Mathematics' general capabilities are easily understood by teachers and parents and offer high degrees of flexibility and choice as to how these are achieved at school level.

Cross-curriculum priorities

By contrast, the cross-curriculum priorities, as currently described, appear to be more arbitrary. At times, connections made between the content descriptions in mathematics and the cross-curriculum priorities appear artificial and forced, such as in Year 4 linking intercultural understanding to the location and representation of simple fractions on a number line. Unlike the general capabilities which, in a simple but non-intrusive manner, are consistently and usefully linked to the content descriptions, the impact of the cross-curriculum priorities is infrequent, minimal and sometimes questionable, at least in their present form.

Achievement standards

The achievement standards of the Australian Curriculum: Mathematics are generally well framed. They are intended to describe 'the quality of learning (the extent of knowledge, the depth of understanding, and the sophistication of skills) that would indicate the student is well placed to commence the learning required at the next level of achievement'. It is important to note that the achievement standards are intended to guide teachers in interpreting what students can do and how to report to parents. They do not specify any particular forms of assessment, and leave schools and teachers with considerable flexibility in how to assess student achievement in terms of content taught *and* the mathematical proficiencies expected of students at different year levels. The wording of the achievement standards, especially the verbs used, are intended to link the various proficiencies to the content. The Australian Curriculum: Mathematics recognises that forms of assessment are likely to change as students' progress through the primary years. They are also expected to be adaptable to different school contexts.

Absence of pedagogical and epistemological assumptions

The Australian Curriculum: Mathematics makes few recommendations about pedagogy in its content descriptions. Very occasionally, the content elaborations may suggest some stimulus materials. Generally, the elaborations refrain altogether from implying particular pedagogical approaches, or any particular theory of learning.

Benchmarking

In this review, the Australian Curriculum: Mathematics is compared to the Japanese Course of Study (COS) and the USA Common Core State Standards (CCSS) using two case studies. Generally, the comparisons are favourable, especially in terms of robustness, balance and flexibility. All three national curriculum documents emphasise the importance of working mathematically within clearly described content, and make it clear that complex mathematics ideas need to build carefully upon previous learning. These two case studies in benchmarking serve to confirm the overall robustness of the Australian Curriculum: Mathematics, but at the same time they identify several areas where the current Australian Curriculum: Mathematics document needs to be improved.

The Japanese COS uses extended content descriptions to develop key ideas over successive year levels, indicating when teaching of these ideas is introductory and when it is to be consolidated and deepened. On the other hand, the USA CCSS makes consistent use of examples and illustrations to explain the underlying mathematics. Its examples convey clearly when key ideas are introduced to students and when these are to be consolidated and developed. Like the Japanese COS, the USA CCSS uses re-visitation in order to prioritise the development of key ideas and skills. In the Australian Curriculum: Mathematics, the priority given to some key ideas and skills could be sharper. Benchmarking the Australian Curriculum: Mathematics alongside these other two documents is carried out in two focus areas. The first focus is on the teaching of Number and place value and Patterns and algebra. There are several ways in which the Australian Curriculum: Mathematics can improve the integration of number and early algebra in the early years to provide a better foundation for the key ideas of equivalence, functional relationships, ratios and variables in the upper primary years. The second focus is on the teaching of Statistics and Probability. Here, the Australian Curriculum: Mathematics is shown to have a commendably strong focus on data, but some key ideas on probability may be introduced too early.

International comparisons and several specific recommendations

Comparisons with the Japanese Course of Study and the USA Common Core State Standards

The Japanese COS is the most robust of the three documents in providing strong foundations for the development of key ideas. Key ideas are carefully introduced, initially with an emphasis on their informal treatment, and in subsequent years they are returned to with greater rigour and attention in its content descriptions. The USA CCSS generally follows this same pattern. This is also true for the Australian Curriculum: Mathematics. However, some key ideas in the Australian Curriculum: Mathematics, such as ratio, equivalence and functional relationships, appear without sufficient prior development of foundational thinking in the preceding years. At other times, the Australian Curriculum: Mathematics makes too rapid a transition from informal to formal thinking, such as in assigning numerical values to probability and distinguishing between dependent and independent events in Year 5, or ‘interpreting features of travel graphs such as the slope of lines and the meaning of horizontal lines’ in Year 7.

Japanese Course of Study (Mathematics)

The Japanese COS is relevant to this review and benchmarking because Japanese students have consistently performed at very high levels in international assessments such as Trends in International Mathematics and Science Study (TIMSS). In the 2011 TIMSS in Mathematics, the mean score for Grade 4 students in the Japanese sample ranked 5th out of 53 participating countries and cities. Only Singapore, Republic of Korea, Hong Kong (SAR) and Chinese Taipei performed better.

The Mathematics Curriculum in the Japanese Course of Study was revised by the Ministry of Education, Sports, Science and Technology (MEXT) on 1 April 2008, to be implemented in elementary schools from 1 April 2011 and in lower-secondary school from 1 April 2012. Two translations of the Japanese COS exist – one published in English by MEXT and a second intended for academic and research purposes, translated by A. Takahashi, T. Watanabe and M. Yoshida. In this review, the author has generally followed the MEXT version, but for clarity of English the second has sometimes

been used. The Mathematics COS sets out objectives and content for each Grade, starting with Grade 1 (there is no Kindergarten or Foundation Year in Japanese primary schools).

The length of the Japanese COS document encompassing Grades 1 to Grade 6 is 21 pages.

USA Common Core State Standards

The state-led effort to develop Common Core State Standards (CCSS) was launched in 2009 by state leaders, including governors and state commissioners of education from 48 states, two territories and the District of Columbia, through their membership in the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The CCSS are intended to ensure all students, regardless of where they live, can graduate from high school prepared for college, career, and life.

The USA CCSS are relevant to this review and benchmarking because they have been developed and are being implemented by the States. The CCSS have also been endorsed by the American Statistical Association and the National Council of Teachers of Mathematics, and wide mix of organisations representing parents, teachers, and business leaders. There are dissenting voices – with some even claiming that the Standards are too rigorous.

As of March 2014, 44 states and several USA territories have adopted the CCSS in Mathematics. They are now in the process of implementing the standards locally. The CCSS in Mathematics describe the critical areas of focus for each Grade level starting from Kindergarten.

In the 2011 TIMSS in Mathematics, the mean score for Grade 4 students in the USA sample ranked 8th out of 53 participating countries and cities, equalling the performance of Finland.

In the USA CCSS document, content from Kindergarten to Grade 6 is described in 36 pages.

The Australian Curriculum: Mathematics

The Australian Curriculum: Mathematics describes content for each Year level starting at Foundation Year. In the Australian Curriculum: Mathematics, content descriptions from Foundation Year to Year 6 are covered in 9 pages. This excludes elaborations of the four Proficiency strands: *Understanding*, *Fluency*, *Problem Solving* and *Reasoning*, and Work Sample Portfolios for each Year Level. Content descriptions are linked to general capabilities which are referenced according to their respective icons in the 9 pages. A longer version of the main document may be had by including elaborations together with content descriptions at each Year level. This version of the Australian Curriculum: Mathematics covers approximately 13 pages.

In the 2011 TIMSS in Mathematics, the mean score for Grade 4 students in the Australian sample ranked 12th out of 53 participating countries and cities. Australia, the United States and Japan were all ranked above the 2011 TIMSS Scale Centrepont for Grade 4. In the 2011 TIMSS in Mathematics, for Grade 8 students, Japan, Australia and the United States were among the top twelve performing countries.

Comparing key features across the three documents

Expressing a robust structure for the discipline of Mathematics

1.1 Structure of the Australian Curriculum Mathematics

The Australian Curriculum: Mathematics organises content using three major headings for the primary and junior secondary years. These are Number and Algebra, Measurement and Geometry, and Statistics and Probability. Within these three headings the Australian Curriculum: Mathematics employs several sub-headings. In Number and Algebra these are *Number and place value* and *Patterns and algebra* which are used at all Year levels through to Year 6. A heading *Fractions and decimals* is introduced in Year 1 and remains through to Year 6. A heading *Money and financial mathematics* is also introduced in Year 1 and continues through to Year 6.

In Measurement and Geometry, three sub-headings are consistently used for all the primary years. These are: *Using units of measurement*, *Shape*, and *Location and transformation*. An additional sub-heading *Geometrical reasoning* is introduced in Year 3 and continues through to Year 6.

In Statistics and Probability, the sub-heading *Data representation and interpretation* is used at all Year levels. A second sub-heading *Chance* is introduced in Year 1 and continues through until Year 6.

1.2 Structure of the Common Core State Standards (CCSS)

The USA CCSS adopts four major sub-headings for Grades K through 5. These are *Operations and algebraic thinking*, *Number and operations in base 10*, *Measurement and data*, and *Geometry*. For Grade K only *Counting and cardinality* is added to the above four. From Grades 3 to 5, an additional sub-heading *Number and operations – Fractions* is included.

At Grade 6, which in the USA signals for many students the commencement of middle (lower secondary) school, the sub-headings change to: *Ratios and proportional thinking*, *The Number system*, *Expressions and equations*, *Geometry*, and *Statistics and probability*. Prior to Grade 6, *Measurement and data* is intended to encompass the treatment of statistics.

1.3 Structure of the Course of study (Japan)

The Japanese COS commences each Grade level with a statement of Objectives. It then describes content from Grade 1 upwards using the following sub-headings: *Number and calculations*, *Quantities and measurements*, *Geometrical figures*, and *Mathematical relations*. At each Grade level there is an additional section relating to *Handling the content* for that particular year level.

1.4 Summary

For the primary school years, all three documents provide teachers with clear advice on what to teach in each Year/Grade level. All three provide students with a solid foundation in whole numbers, starting with counting and including addition, subtraction, multiplication, and division. Students learn to apply each of the four operations to quite different contexts. For example, as the USA CCSS emphasise, addition and subtraction represent not only the actions of adding to and taking away, but they also represent putting together, taking apart (part-part-whole) and comparing (difference). All three documents give teachers clear advice on the teaching of fractions and decimals.

While the sub-headings vary in minor ways in each national document, the treatment of mathematics as a discipline is in each case comprehensive and demonstrates a continuous progression from year to year in number, measurement, geometry and data representation and interpretation. All three documents share a common goal of linking students' development of number knowledge to working with equations, identifying patterns and relationships and learning to reason and generalise. In the primary years the Australian Curriculum: Mathematics, the Japanese COS and the USA CCSS all aim to provide a strong foundation for all students to proceed to more complex mathematics topics, such as algebra, geometry, probability and statistics in secondary school.

Fostering and applying mathematical thinking

All three documents are clear that learning to work and think mathematically is essential at every stage of schooling. This goal is conveyed to teachers differently in the three documents.

2.1 Structure of the Australian Curriculum Mathematics

The Australian Curriculum: Mathematics utilises four proficiency strands Understanding, Fluency, Problem Solving and Reasoning. These are an integral part of mathematics content across the three content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability. The four Proficiencies are essential to maintaining a proper balance between knowledge, skills and understanding. The proficiencies aim to reinforce the significance of working mathematically within the content, and describe how the content is explored or developed at each Year level. Each Year level has its own statement relating to how the four Proficiencies are to be applied.

2.2 Structure of the Course of study (Japan)

In the Japanese COS, a similar role is played by the statement of Objectives specific to each Grade level. Inclusion of a sub-heading entitled 'Mathematical relations' plays a similar role.

2.3 Structure of the Common Core State Standards (CCSS)

In the USA CCSS, eight mathematical practices are intended to apply at every Grade. These eight are: Make sense of problems and persevere in solving them; Reason abstractly and quantitatively; Construct viable arguments and critique the reasoning of others; Model with mathematics; Use appropriate tools strategically; Attend to precision; Look for and make use of structure; and Look for and express regularity in repeated reasoning. These eight mathematical practices seem to be intended to play a similar role to the four Proficiencies of the Australian Curriculum: Mathematics. Their relevance at each Grade level in the CCSS is conveyed in part by way of exemplifications. Having eight mathematical practices may, according to some critics, take attention away from what they regard as fundamentals. In this respect, the four Proficiencies of the Australian Curriculum: Mathematics are less open to criticism.

2.4 Summary

In addition, the Australian Curriculum: Mathematics includes seven general capabilities: literacy, numeracy, information and communication technology (ICT) capability, critical and creative thinking, personal and social capability, ethical understanding, and intercultural understanding. These are different to the four (mathematical) Proficiencies, and are important in the primary years where teachers need to plan for the all-round development of students' thinking. The first four general

capabilities feature more frequently in the Australian Curriculum: Mathematics. However, the others are relevant and need be considered in the teaching of mathematics. For example, ethical issues, such being fair and truthful in collecting and reporting data, need to be learned in the primary school years. The Australian Curriculum: Mathematics' three current cross-curriculum priorities – Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia, and sustainability – seem to be related less directly to the teaching and learning of mathematics in the primary school years, than the general capabilities which clearly are.

Academic rigour

The Australian Curriculum: Mathematics, the Japanese COS and the USA CCSS promote rigour by requiring a deep understanding of content at each grade level, and by providing teachers with sufficient focus to make that possible. While the content at each grade level is demanding for all students, all three documents identify rigour with depth of treatment and ensuring that students can make the necessary links between different topics. For instance, in Grade 3 in Japan and in Grade 4 in the USA CCSS, multiplication of two two-digit numbers draws on strategies based on place value and the properties of operations; and where students can illustrate and explain their calculations by using equations, rectangular arrays, and/or area models.

The four Proficiencies of the Australian Curriculum: Mathematics are intended to foster deep understanding. In addition, the content elaborations are also intended to draw teachers' attention to mathematical connections between areas of content. Content elaborations in the Australian Curriculum: Mathematics are also employed to make connections to other curriculum areas. They also give possible contexts for teaching and suggest teaching approaches. As can be seen from the benchmarking exercises which follow below, the majority of the content elaborations are mathematically focussed. However, some appear to be more effective in elaborating the essential mathematics than others. It has to be said that the format of the Australian Curriculum: Mathematics imposes limits on what can be discussed in any depth in its elaborations. Slightly longer and more explicit elaborations in the USA CCSS appear to be more effective from a mathematical point of view. In the benchmarking exercise that follows, there are some suggestions, based on the Japanese COS and the USA CCSS, where the mathematical rigour of some of the content descriptions and elaborations in the Australian Curriculum: Mathematics could be strengthened. Content elaborations for the Australian Curriculum: Mathematics are presented as dot points in the tables to follow.

Benchmarking between the Australian Curriculum: Mathematics, Japanese COS and USA CCSS

Table 3.1: Number and place value/ Patterns and algebra – Year 1

YEAR 1: Australian Curriculum Mathematics	
<p>Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero (ACMNA012)</p> <ul style="list-style-type: none"> • using the popular Korean counting game (sam-yuk-gu) for skip counting • developing fluency with forwards and backwards counting in meaningful contexts such as circle games <p>Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line (ACMNA013)</p> <ul style="list-style-type: none"> • modelling numbers with a range of material and images • identifying numbers that are represented on a number line and placing numbers on a prepared number line <p>Count collections to 100 by partitioning numbers using place value (ACMNA014)</p> <ul style="list-style-type: none"> • understanding partitioning of numbers and the importance of grouping in tens • understanding two-digit numbers as comprised of tens and ones/units <p>Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (ACMNA015)</p> <ul style="list-style-type: none"> • developing a range of mental strategies for addition and subtraction problems <p>Investigate and describe number patterns formed by skip counting and patterns with objects (ACMNA018)</p> <ul style="list-style-type: none"> • using place-value patterns beyond the teens to generalise the number sequence and predict the next number • investigating patterns in the number system, such as the occurrence of a particular digit in the numbers to 100 	
Grade 1: USA CCSS	Grade 1: Japan COS
<p>Represent and solve problems involving addition and subtraction</p> <ul style="list-style-type: none"> • Use addition and subtraction to 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem <p>Understand and apply properties of operations and the relationship between addition and subtraction.</p> <ul style="list-style-type: none"> • Examples: if $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known (Commutative property of addition) • Understand subtraction as an unknown 	<p>Numbers and Calculations</p> <ol style="list-style-type: none"> 1. Through activities such as counting the numbers of concrete objects, to help pupils to understand the meaning of numbers and use numbers appropriately. <ol style="list-style-type: none"> a. To compare numbers of objects by making one-to-one correspondence between objects b. To correctly count or represent the number and order of objects. c. To make a sequence of numbers and to put numbers on a number line by judging the size and the order of the numbers. d. To consider a number in relation to other numbers by regarding it as a sum or difference of other numbers. e. To understand how to represent two-digit numbers.

YEAR 1: Australian Curriculum Mathematics	
<p>addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.</p> <p>Work with addition and subtraction equations</p> <ul style="list-style-type: none"> Understand the meaning of equal sign and determine if equations involving addition and subtraction are true or false. For example which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$. Determine the unknown number in an addition or subtraction equation relating three whole numbers. For example determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = \square - 3$, $6 + 6 = 12$ 	<ul style="list-style-type: none"> f. To understand how to represent three-digit numbers in simple cases. g. To consider numbers using ten as a unit <p>2. To help pupils understand the meaning of addition and subtraction and to use those operations appropriately. To get to know situations where addition and subtraction are used. To explore ways of addition of two one-digit numbers and the difference as the inverse operation, and to do these calculations accurately. To think about the ways of calculating simple sums and differences of two-digit numbers.</p> <p>Mathematical relations</p> <ol style="list-style-type: none"> To help pupils represent situations where addition and subtraction are used, by algebraic expressions, and interpret these expressions.

Table 3.2: Number and place value/ Patterns and algebra – Year 2

Year 2: Australian Curriculum Mathematics
<p>Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences (ACMNA0026)</p> <ul style="list-style-type: none"> developing fluency and confidence with numbers and calculations by saying number sequences recognising patterns in number sequences, such as adding 10 always results in the same final digit <p>Recognise, model and order numbers to at least 1000 (ACMNA0027)</p> <ul style="list-style-type: none"> recognising there are different ways of representing numbers and identifying patterns going beyond 100 developing fluency with writing numbers in meaningful contexts <p>Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate counting (ACMNA0028)</p> <ul style="list-style-type: none"> using an abacus to model and represent numbers understanding three-digit numbers as comprised of hundreds, tens and ones/units demonstrating and using models such as linking blocks, sticks in bundles, place-value blocks and Aboriginal bead strings and explaining reasoning <p>Explore the connection between addition and subtraction (ACMNA0029)</p> <ul style="list-style-type: none"> becoming fluent with partitioning numbers to understand the connection between addition and subtraction using counting on to identify the missing element in an additive problem <p>Solve simple addition and subtraction problems using a range of efficient mental and written strategies (ACMNA0030)</p>

Year 2: Australian Curriculum Mathematics

- becoming fluent with a range of mental strategies for addition and subtraction problems, such as commutativity for addition, building to 10, doubles, 10 facts and adding 10
- modelling and representing simple additive situations using materials such as 10 frames, 20 frames and empty number lines

Recognise and represent multiplication as repeated addition, groups and arrays (ACMNA0031)

- representing array problems with available materials and explaining reasoning
- visualising a group of objects as a unit and using this to calculate the number of objects in several identical groups

Recognise and represent division as grouping into equal sets and solving simple problems using these representations (ACMNA0032)

- dividing the class or a collection of objects into equal-sized groups
- identifying the difference between dividing a set of objects into three equal groups and dividing the same set of objects into groups of three

Describe patterns with numbers and identify missing elements (ACMNA0035)

- describing a pattern created by skip counting and representing the pattern on a number line
- investigating features of number patterns resulting from adding twos, fives or 10s

Solve problems by using number sentences for addition and subtraction (ACMNA0036)

- representing a word problem as a number sentence
- writing a word problem to represent a number sentence

Grade 2: USA CCSS	Grade 2: Japan COS
<p><u>Operations and Algebraic Thinking</u> Represent and solve problems using addition and subtraction</p> <ul style="list-style-type: none"> • Use addition and subtraction within 100 to solve one- and two-step problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g. by using drawings and equations with a symbol for the unknown number to represent the problem <p>Add and subtract within 20</p> <ul style="list-style-type: none"> • Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers <p>Work with equal groups of objects to gain foundations for multiplications</p> <ul style="list-style-type: none"> • Determine whether a group of objects (up to 20) has an odd or even number of members, e.g. by pairing objects or counting them by 2s; write an equation to 	<p>Numbers and calculations</p> <p>1. To help pupils understand the meaning of representations of numbers, and extend their ability to use numbers.</p> <ol style="list-style-type: none"> To count objects by arranging them in groups of the same size, or by classifying them. Up to four-digit numbers, to understand the representations of numbers, understand sixe and order of numbers by the decimal positional numeration system. To understand the relative size of numbers by regarding 10 or 100 as a unit. To consider a number in relation to other numbers by regarding it as a product of other numbers. <p>2. To help pupils deepen their understanding of addition and subtraction, and extend their ability to use the calculations.</p> <ol style="list-style-type: none"> To explore ways of addition and of two-digit numbers and subtraction as the inverse operation, to understand that these calculations are based on the basic

Year 2: Australian Curriculum Mathematics

express an even number as the sum of two equal addends

Number and Operations in Base Ten

Understand place value

1. Understand that the three digits of a three digit number represent amounts of hundreds, tens, and ones; e.g. 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

- 100 can be thought of as a bundle of ten tens – called a ‘hundred’
- The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2. Count within 1000; skip-count by 5s, 10s and 100s.

3. Read and write numbers to 1000 using base-ten numbers, number names and expanded form.

4. Compare two three-digit numbers based on meanings of the hundreds, tens and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract

5. Fluently add and subtract within 1000 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction

6. Add up to four two-digit numbers using strategies based on place value and properties of operations

7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds

8. Mentally add 10 or 100 to a given number 100-900; and mentally subtract 10 or 100 from a given number 100-900

9. Explain why addition and subtraction strategies work, using place value and properties of operations

calculations of one-digit numbers, and to do accurately. To understand the way of calculation using algorithms in column forms.

- b. To explore ways of addition of three-digit numbers and so on in simple cases
- c. To explore properties of addition and subtraction and to make use of the properties in order to explore ways to calculate or check the results

3. To help pupils understand the meaning of multiplication and use the calculation

- a. To get to know situations where multiplication is used
- b. To explore simple properties which hold for multiplication, and to make use of them for making the multiplication table up to 9 times

Mathematical relations

- To help pupils understand the mutual relationships between addition and subtraction and explain them using algebraic expressions
- (relates to data – see below)
- To help students represent situations where multiplication is used, by using algebraic expressions, and interpret these expressions

General comments

This treatment of Number and Algebra in Australian Curriculum Mathematics compares favourably with related treatments in the USA Common Core State Standards and the Japanese Course of Study. The USA CCSS provides teachers with some clearer mathematical explanations of what is intended. However, throughout the primary years, there are no major omissions in the Australian document. Differences in timing exist in the three documents. Some of these are not important, but some are and they will be pursued later sections of this report.

Closer integration of number and algebra needed in the Australian Curriculum: Mathematics

While the Australian Curriculum: Mathematics consistently utilises Number and Algebra as a key content description in the primary years, both the USA CCSS and the Japanese COS give more explicit attention to integrating number and algebra from the beginning of the primary years. For example, the USA CCSS emphasises the importance of introducing students to understanding the meaning of the equals sign (see Grade 2 above) and to determining the value of an unknown number that makes an equation true; as well as asking students to consider whether equations are true or false, not necessarily by using calculation.

In introducing students to unknown numbers in equations, the USA CCSS uses simple representations for unknown numbers (See Grade 1). Likewise the Japanese document encourages students to represent by algebraic sentences situations where addition and subtraction are used; that is, by leaving number sentences in uncalculated form. In Grade 2, the USA CCSS also expects students to be familiar with and use $>$, $=$, and $<$ symbols to record the results of comparisons.

In Grade 3, the Japanese COS is explicit in helping pupils '(t)o represent numbers and quantities by using \square to represent the relationships between (unknown and known) numbers/quantities in algebraic expressions, and to explore the expressions by substituting numbers for \square . By Grade 6, Japanese students are expected to represent relationships in algebraic expressions by using letters such as 'a' and 'x' instead of words, and by symbols, such as \square and Δ , and to explore the corresponding relationships by substituting numbers for the letters or symbols.

Likewise, from Grade 1, the USA CCSS includes the need to 'solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g. by using objects, drawings and equations with a symbol for the unknown number to represent the problem'. This sentence reminds teachers that, structurally, addition and subtraction represent not only the actions of adding to and taking away, but they also represent putting together, taking apart (part-part-whole) and comparing (difference). In these ways, the USA CCSS and the Japanese COS both provide a clearer integration of number and algebra than the Australian Curriculum: Mathematics while in no way reducing the importance of accurate and fluent written and mental calculation.

Use of rounding and estimation

In the later primary years, rounding and estimation are appropriately introduced in the Australian Curriculum: Mathematics. For example, in Year 5 the Australian Curriculum: Mathematics has: Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099). Rounding and estimation are also included appropriately in the Australian Curriculum: Mathematics

for Year 6: Add and subtract decimals ... and use estimation and rounding to check the reasonableness of answers (ACMNA128). The Japanese COS also places appropriate emphasis on the use of 'rounding numbers' (e.g. rounding to the nearest ten, or hundred, or to the nearest whole number) in checking calculations and estimation. By Grade 4, Japanese students are expected to 'get to know cases where the use of round numbers is appropriate, to round to the nearest integer, and to estimate the results of the four rules of calculation (operations) according to one's purpose'.

Earlier introduction the idea of variable and numbers that vary with each other

One key difference between the Australian Curriculum: Mathematics and the two other documents in the area of Number and Algebra is the explicit attention the USA and Japanese documents to introducing students to the idea of a variable number in the later primary years. In the Australian Curriculum: Mathematics, the idea of a variable first appears in Patterns and algebra in Year 7:

*Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)
Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176).*

While the concept of variables is important in Year 7, it is necessary to provide students with some foundations leading to this key idea in the preceding years. This is done more strategically in the USA CCSS and in the Japanese COS, as can be seen below:

In Grade 6, the USA CCSS, in dealing with Expressions and Equations, under the sub-heading Reason about and solve one-variable equations and inequalities:

- *Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.*

Also in Grade 6, under the sub-heading, Represent and analyse quantitative relationships between dependent and independent variables:

- *Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed (65 mph), list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.*

The Japanese COS treats the idea of variables under Mathematical Relations in Grades 4, 5 and 6:

Grade 4

- *To help pupils represent and explore the relationships between two numbers/quantities as they vary simultaneously. To represent how the numbers/quantities vary on a broken-line graph and to interpret features of their variation.*

These ideas are re-visited in the Japanese COS in Grades 5 and 6:

Grade 5

- *To help pupils use tables to explore the relationships between two quantities as they vary simultaneously. To get to know proportional relationships in simple cases.*
- *To help pupils deepen their understanding of algebraic expressions that represent relationships between numbers/quantities, and pay attention to the correspondence between two numbers/quantities and the aspect of variation in the relationships represented by simple algebraic expressions.*

Grade 6

- *To help pupils explore the relationships of two numbers/quantities as they vary simultaneously.*
- *To understand proportional relationships, and to explore their features by using algebraic expressions, tables and graphs.*
- *To solve problems by using proportional relationships.*
- *To get to know inversely proportional relationships.*

The Australian Curriculum: Mathematics should take note of these treatments, especially in the Japanese COS. There should be clearer opportunities in the Australian Curriculum: Mathematics for students in the middle and upper primary years to consider relationships between two quantities as they vary simultaneously. Students should also be introduced to simple ratios. (Ratio does not appear in the Australian Curriculum: Mathematics until Year 7 – ACMNA173.) These opportunities can be provided by having students consider situations such as, ‘Some people say that one year in a dog’s life is similar to seven years for a human being. What might this mean?’ Through careful use of examples of rates, such as walking-speed or the speed of a car, foundations can and should be prepared in the primary years for understanding how one quantity varies with another.

Table 3.3: Statistics and Probability – Year 2

Year 2: Australian Curriculum Mathematics	
Chance	
Identify practical activities and everyday events that involve chance. Describe outcomes as ‘likely’ or ‘unlikely’ and identify some events as ‘certain’ or ‘impossible’ (ACMSP047)	
	<ul style="list-style-type: none"> • classifying a list of everyday events according to how likely they are to happen, using the language of chance, and explaining reasoning
Data representation and interpretation	
Identify a question of interest based on one categorical variable. Gather data relevant to the question (ACMSP048)	
	<ul style="list-style-type: none"> • determining the variety of birdlife in the playground and using a prepared table to record observations
Collect, check and classify data (ACMSP049)	
	<ul style="list-style-type: none"> • recognising the usefulness of tally marks

Year 2: Australian Curriculum Mathematics

- identifying categories of data and using them to sort data

Create displays of data using lists, table and picture graphs and interpret them (ACMSP050)

- creating picture graphs to represent data using one-to-one correspondence
- comparing the usefulness of different data displays

Grade 2: Common Core State Standards USA (CCSS)	Grade 2: Japan Course of Study (COS)
<p>Represent and interpret data</p> <p>Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.</p> <p>Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in the bar graph.</p>	<p>Mathematical relations</p> <ul style="list-style-type: none"> To help pupils organise and classify numbers and quantities in everyday life and represent them by using simple tables and graphs and interpret these representations

Table 3.4: Statistics and Probability – Year 3

Year 3: Australian Curriculum Mathematics

Chance

Conduct chance experiments, identify and describe possible outcomes and recognise variation in results (ACMSP067)

- conducting repeated trials of chance experiments such as tossing a coin or drawing a ball from a bag and identifying the variations between trials

Data representation and interpretation

Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068)

- refining questions and planning investigations that involve collecting data, and carrying out the investigation (for example narrowing the focus of a question such as ‘which is the most popular breakfast cereal?’ to ‘which is the most popular breakfast cereal among Year 3 students in our class?’)

Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069)

- exploring meaningful and increasingly efficient ways to record data, and representing and reporting the results of investigations
- collecting data to investigate features in the natural environment
- interpret and compare data displays (ACMSP070)
- comparing various student-generated data representations and describing their similarities and differences

Year 3: Australian Curriculum Mathematics	
Grade 3: USA CCSS	Grade 3: Japan COS
<p>Represent and interpret data.</p> <p>Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step 'how many more' and 'how many less' problems using information presented in scaled bar graphs. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i> Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.</p>	<p>Mathematical relations</p> <ul style="list-style-type: none"> To help students organise and classify data, and represent them clearly by using tables and graphs, and interpret these representations. To get to know how to interpret and draw bar graphs.

Table 3.5: Statistics and Probability – Year 4

Year 4: Australian Curriculum Mathematics
<p>Chance</p> <p>Describe possible everyday events and order their chances of occurring (ACMSP092)</p> <ul style="list-style-type: none"> using lists of events familiar to students and ordering them from 'least likely' to 'most likely' to occur <p>Identify everyday events where one cannot happen if the other happens (ACMSP093)</p> <ul style="list-style-type: none"> using examples such as weather, which cannot be dry and wet at the same time <p>Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)</p> <ul style="list-style-type: none"> explaining why the probability of a new baby being either a boy or a girl does not depend on the sex of the previous baby <p>Data representation and interpretation</p> <p>Select and trial methods for data collection, including survey questions and recording sheets (ACMSP095)</p> <ul style="list-style-type: none"> comparing the effectiveness of different methods of collecting data choosing the most effective way to collect data for a given investigation <p>Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)</p> <ul style="list-style-type: none"> exploring ways of presenting data and showing the results of investigations investigating data displays using many-to-one correspondence <p>Evaluate the effectiveness of different displays in illustrating data features including variability (ACMSP097)</p> <ul style="list-style-type: none"> interpreting data representations in the media and other forums in which symbols represent more than one data value suggesting questions that can be answered by a given data display and using the display to answer questions

Year 4: Australian Curriculum Mathematics	
Grade 4: USA CCSS	Grade 4: Japan COS
<p>Represent and interpret data.</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i></p>	<p>Mathematical relations</p> <p>To help pupils gather and organise data according to their purposes, and represent them clearly using tables and graphs, and explore features of data.</p> <ul style="list-style-type: none"> To explore features of the data by organising the data from two viewpoints To get to know how to interpret and draw broken-line graphs

Table 3.6: Statistics and Probability – Year 5

Year 5: Australian Curriculum Mathematics	
<p>Chance</p> <p>List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)</p> <ul style="list-style-type: none"> commenting on the likelihood of winning simple games of chance by considering the number of possible outcomes and the consequent chance of winning in simple games of chance such as jan-ken-pon (rock-paper-scissors) <p>Recognise that probabilities range from 0 to 1 (ACMSP117)</p> <ul style="list-style-type: none"> investigating the probabilities of all outcomes for a simple chance experiment and verifying that their sum equals 1 <p>Data representation and interpretation</p> <p>Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)</p> <ul style="list-style-type: none"> posing questions about insect diversity in the playground, collecting data by taping a one-metre-square piece of paper to the playground and observing the type and number of insects on it over time <p>Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)</p> <ul style="list-style-type: none"> identifying the best methods of presenting data to illustrate the results of investigations and justifying the choice of representations <p>Describe and interpret different data sets in context (ACMSP120)</p> <ul style="list-style-type: none"> using and comparing data representations for different data sets to help decision making 	
Grade 5: USA CCSS	Grade 5: Japan COS
<p>Represent and interpret data.</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of</i></p>	<p>Mathematical relations</p> <p>To help pupils gather and organise data according to their purposes, and represent them by using pie graphs and band graphs, and investigate features of data.</p>

Year 5: Australian Curriculum Mathematics

liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Table 3.7: Statistics and Probability – Year 6

Year 6: Australian Curriculum Mathematics

Chance

Describe probabilities using fractions, decimals and percentages (ACMSP144)

- investigating games of chance popular in different cultures and evaluating the relative benefits to the organisers and participants (for example Pachinko)

Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)

- conducting repeated trials of chance experiments, identifying the variation between trials and realising that the results tend to the prediction with larger numbers of trials

Compare observed frequencies across experiments with expected frequencies (ACMSP146)

- predicting likely outcomes from a run of chance events and distinguishing these from surprising results

Data representation and interpretation

Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)

- comparing different student-generated diagrams, tables and graphs, describing their similarities and differences and commenting on the usefulness of each representation for interpreting the data
- understanding that data can be represented in different ways, sometimes with one symbol representing more than one piece of data, and that it is important to read all information about a representation before making judgments

Interpret secondary data presented in digital media and elsewhere (ACMSP148)

- investigating data representations in the media and discussing what they illustrate and the messages the people who created them might want to convey
- identifying potentially misleading data representations in the media, such as graphs with broken axes or non-linear scales, graphics not drawn to scale, data not related to the population about which the claims are made, and pie charts in which the whole pie does not represent the entire population about which the claims are made

Grade 6: USA CCSS	Grade 6: Japan COS
<p>Develop understanding of statistical variability.</p> <p>Recognise a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, ‘How old am I?’ is not a statistical question, but ‘How old are the students in my school?’ is a statistical question because one</i></p>	<p>Mathematical relations</p> <p>To help pupils determine the average of data and the distribution of data, and to explore and represent data statistically</p> <ul style="list-style-type: none"> • To get to know the average of the results • To get to know the tables and graphs that

Year 6: Australian Curriculum Mathematics

anticipates variability in students' ages.

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Recognise that a measure of center for a numerical data set summarises all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Summarise and describe distributions.

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Summarise numerical data sets in relation to their context, such as by:

- Reporting the number of observations.
- Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

represent frequency distribution

To help pupils analyse all the possible outcomes systematically for actual events.

Strong and consistent treatment of data in the Australian Curriculum: Mathematics

In the treatment of data, there are close similarities between the three documents. Australia, the USA and Japan all place a high importance on developing students' ability to gather data to suit their own interests and purposes; to represent data; to become confident in reading data in various formats; and to pose their own questions. The Australian Curriculum: Mathematics gives a clearer emphasis to the use of digital technologies for constructing data displays. This implies – quite correctly – that study of data does not stop at learning how to construct various ways of representing data, but needs to include knowing how to summarise data, interpret data, posing questions and asking what the data means.

Central to all three documents is the goal that children, throughout their primary years, should develop concepts and skills of using, reading and interpreting data; to become disposed to think of using data; and to know how to extract information from data.

The USA CCSS employs the organising heading *Measurement and Data* for Grades K to 5. As a result, the USA CCSS is more explicit on the use of measurement as a source of data (See Grade 2) and how

data is displayed (Grade 4). It also views a data display as a context for asking ‘how many more’, ‘how many less’, ‘how many altogether’ (Grades 2 and 3).

All three documents give close attention to the different kinds of data displays that students should learn. The Australian document also gives more explicit attention to the value of utilising secondary data and its relation to developing students’ general capabilities of literacy, numeracy, ICT capability, etc. This requires students to appreciate clearly the key idea of variability of data.

Variability of data

The idea of variability is touched on by the Australian Curriculum: Mathematics in Year 4: ‘Evaluate the effectiveness of different displays in illustrating data features including variability (ACMSP097). It is also left implicit in the Japanese document. On the other hand, the USA CCSS points out that ‘a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers’ (Grade 6). The idea of variability is fundamental whenever data is present.

Some issues about the Australian Curriculum: Mathematics’ treatment of Probability (Chance) in the primary years

The USA CCSS and the Japanese COS both begin the formal treatment of probability later than in the Australian Curriculum: Mathematics – in Grade 6 in the case of Japan, and in Grade 7 in the case of the USA. The Japanese COS in Grade 6 includes: ‘To help pupils analyse all the possible outcomes systematically for actual events’. Prior to Grade 6, the Japanese COS does not include any treatment of chance or probability.

In the USA CCSS, the organising heading *Statistics and Probability* appears first at Grade 6, and the formal study of Probability (Chance) commences in Grade 7:

Investigate chance processes and develop, use, and evaluate probability models.

Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.

Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Although the Australian Curriculum: Mathematics uses its content description *Statistics and Probability* from Foundation Year onwards, its formal treatment of *Probability (Chance)* begins in Year 5 where the Australian Curriculum: Mathematics includes: ‘List outcomes of chance

experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)', and 'Recognise that probabilities range from 0 to 1 (ACMSP117)'. This assumes that Year 5 students understand the concept of a sample space, and understand how to assign fraction or decimal values to (theoretical) probabilities.

This represents a major – some might say a huge – advance in the treatment of Chance in Year 5 compared to previous years, where the Australian Curriculum: Mathematics' treatment of chance is strictly informal (from a mathematical point of view), relying on students' opinions and beliefs, and in developing language to describe, in students' own terms, events which they regard to be 'highly unlikely', 'likely', 'very likely' or 'certain' to occur. (One assumes that teachers in the USA and Japan also attend to these conversational aspects of 'chance' with young children.) Assigning fractional values to probabilities also assumes an understanding of ratio which first appears in the Australian Curriculum: Mathematics in Year 7 as 'Recognise and solve problems involving simple ratios (ACMNA173)'. Expecting Australian students in Year 5 to 'Recognise that probabilities range from 0 to 1 (ACMSP117)' appears quite unrealistic.

Japanese students in Grade 6 are first expected to 'analyse all the possible outcomes systematically for actual events'. At the same time teachers are expected to 'help pupils to understand ratio'. Only in Grade 8 are students expected to 'understand the need for and meaning of probability, and to be able to determine (values for) probability in simple cases'. In the USA CCSS, the formal treatment of probability begins in Grade 7 (generally the second year of Middle School) where students *Investigate chance processes and develop, use, and evaluate probability models.*

The expectation in the Australian Curriculum: Mathematics that Year 5 students can move to a formal appreciation of probability and to assign values to the probability of a specified outcome is open to question. The approaches taken by the Japanese COS and the USA CCSS seem to be more careful and consistent with research on what primary-age students can understand and do. There is an important role in the primary years for students' exploring chance events through rolling dice, coin tossing and other experiences. All three curriculum documents recognise this. Only the Australian Curriculum: Mathematics assumes that primary school students are ready to move to a more abstract level of understanding.

4. Mathematics (Years 7 to 12) – Catholic Education Office Melbourne (CEOM), Mathematics Advisory Team

Executive Summary

Years 7-9

The Japanese Course of Study (COS), the USA Common Core State Standards (CCSS) and the Australian Curriculum: Mathematics all express a high level of robustness.

The Australian Curriculum: Mathematics has a strong organising structure and in most cases the content is carefully sequenced. The Australian Curriculum: Mathematics introduces most concepts in number and algebra at the same level or within a year of the comparison curricula. The Australian Curriculum: Mathematics continues a strong focus on number concepts through Year 7 and delays the formal introduction of functions until Year 10. The Australian Curriculum: Mathematics could be further strengthened by explicitly including opportunities to informally develop concepts such as functions in related topics in earlier years.

The Australian Curriculum: Mathematics Statistics and Probability 7-10 is appropriately sequenced and challenging. The depth of learning described in this strand provides a strong basis for senior secondary courses. The level described is more challenging at Year 9 than the Japan COS.

The Japan COS is strongest in terms of sequencing, succinctness, timing of introduction of new concepts and clarity of identification of important mathematical concepts to be learned. The objectives demonstrate a clear progression in the development of understanding. The content descriptions that follow are carefully sequenced, mostly expressed as understandings.

The interweaving of the proficiencies through the content descriptions and the achievement standards contributes significantly towards the coherence of the Australian Curriculum: Mathematics. This emphasis on the importance of working mathematically within the content is significant for the development of connections to other topics and developing balance between understanding, fluency, problem solving and reasoning. This feature of the Australian Curriculum: Mathematics is important in encouraging deep learning and could be further strengthened by a more consistent expression of the mathematical understanding to be developed in the content descriptions and the elaborations. The general capabilities provide guidance for developing skills for lifelong learning in the mathematics classroom in a meaningful and productive way and contribute to the overall strength of the Australian Curriculum: Mathematics lower secondary levels.

Unlike the general capabilities, the cross-curriculum priorities in their current format will not substantially enrich learning in mathematics. The few links to the cross-curriculum priorities that are included do provide a context in which to engage in mathematics, but do not contribute significantly to developing understanding of the priorities.

The elaborations in all three documents play an important role in communicating the key features of the mathematics to be studied and in this sense are a key contributor to the robustness of the curriculum. Some Australian Curriculum: Mathematics elaborations do not add to the mathematical

clarity of what students are expected to learn, instead providing contextual or resource advice. Japan COS and USA CCSS elaborations focus more specifically on the important mathematics, thus enhancing the overall coherence of these documents.

Each of the documents compared in this report has its own particular features and strengths. Each employs a sound, although different, organising structure. The Australian Curriculum: Mathematics elaborations do not support the content statements as effectively as either Japan COS or USA CCSS. A strength of Japan COS lies in the description of the understanding that students are expected to develop or deepen. The Australian Curriculum: Mathematics expresses a strong intent that students should understand concepts in the proficiencies and some of the elaborations. Consistent expression of what students are expected to understand within the content descriptions and elaborations could enhance the strength the Australian Curriculum: Mathematics. With revisions of this nature the Australian Curriculum: Mathematics document would be well placed to avoid some of the possible unintended consequences of the USA CCSS very detailed document and provide the explicit mathematical focus of the Japan COS.

The online format of the Australian Curriculum: Mathematics allows considerable flexibility for the user in its current format. Links to specific high quality resources providing pedagogical and contextual support could reduce the need for a lengthy document.

The Australian Curriculum: Mathematics has a strong focus on number in Year 7, covering some skills that are in the primary years of both Japan COS and USA CCSS. It is important that the intended curriculum at Years 6 and 7 allows for connected development of concepts and skills. Any changes at either level need to take the sequence of how understanding and skills typically develop into account.

Year 10 and senior secondary Mathematics

The Australian Curriculum: Mathematics senior secondary Mathematics courses provide for a variety student of pathways, including a course for workplace, personal and further learning settings. They compare favourably with both Ontario Mathematics and Finland Mathematics in flexibility of courses for student pathways and the level of mathematics described.

In each of the senior secondary courses compared it is expected that students will work mathematically within the content, continuing on from the lower secondary courses.

The Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics together describe content of a difficulty comparable with Finland Upper Secondary Advanced courses. With the exception of integral calculus, Ontario offers courses of a similar level.

Introduction

This analysis of the Secondary Australian Curriculum: Mathematics includes a review of the relevance of the content and elaborations, and of key elements of the Australian Curriculum, including general capabilities, achievement standards and cross-curriculum priorities. The analysis has been conducted in two sections, Years 7- 9 and 10-12.

In reviewing the elements of an intended curriculum document many factors need to be considered. What is the purpose of this document? Who will use it and why? What level of pedagogical content knowledge is needed to be able to interpret the document to develop effective lessons? Are there good resources to complement what is in the document?

To help illuminate these factors, the Years 7-9 Australian Curriculum: Mathematics was compared with the USA Years 7 and 8 sections of the USA CCSS and the Years 7-9 Japanese COS (Mathematics). The review of the Primary Years Curriculum used the same documents for Years F-6. Later sections of this report consider the processes of development of these documents.

The Years 10-12 Australian Curriculum: Mathematics was compared with the Ontario Curriculum Grades 10, 11 and 12 alongside the Finnish National Core Curriculum for Upper Secondary Schools 2003. The Year 10 curriculum review was included with the senior secondary curriculum in an attempt to align structurally with the comparison documents.

The Australian Curriculum Mathematics

For the purposes of this part of the analysis the Australian Curriculum: Mathematics is discussed in terms of 2 stages of schooling; The Australian Curriculum: Mathematics Years 7 -10 and the Australian Curriculum: Mathematics senior secondary years.

Years 7-10

The structure of the Australian Curriculum: Mathematics document is consistent for all levels from Foundation through to Year 10 and 10A. The Australian Curriculum, Assessment and Reporting Authority (ACARA) states that:

The 10A content is optional and is intended for students who require more content to enrich their mathematical study whilst completing the Year 10 content. It is not anticipated that all students will attempt the 10A content, but doing so would be advantageous for students intending to pursue Mathematical Methods (Course C) or Specialist Mathematics (Course D) in the senior secondary years. A selection of topics from the 10A curriculum can be completed according to the needs of the students.¹

Content elaborations are provided for Foundation to Year 10 to illustrate and exemplify content and assist teachers to develop a common understanding of the content descriptions. They are not intended to be comprehensive content points that all students need to be taught.

In TIMSS 2011 Mathematics the mean score for the Australian sample ranked 12th out of 45 participating countries and regions.

Years 11-12 (senior secondary)

The senior secondary Australian Curriculum: Mathematics incorporates a statement of rationale and a set of aims, content descriptions that specify what students are to be taught across four units and

¹ <http://www.australiancurriculum.edu.au/mathematics/mathematics-across-foundation-to-year-12>, accessed 11/06/2014

achievement standards that describe the quality of learning expected of students at five levels for each pair of units (1 and 2; 3 and 4).

The courses are: Essential Mathematics Units 1-4, General Mathematics units 1-4, Mathematical Methods Units 1-4, Specialists Mathematics Units 1-4. State and territory curriculum, assessment and certification authorities are responsible for how senior secondary courses are organised, and they will determine how the Australian Curriculum content and achievement standards are to be integrated into their courses.

Accessibility of Curriculum Documentation

The Australian Curriculum: Mathematics online curriculum documentation has the following features:

- Guided video tour of the mathematics curriculum and ways of accessing and using various features of the document.
- The rationale and aims of the Mathematics Curriculum are viewable on entry to the Mathematics Curriculum pages.
- The organisation of the Foundation to Year 10 Mathematics curriculum is immediately viewable from a tab. From the organisation tab access is quickly gained to descriptions of related curriculum elements, including a glossary of terms used in the Mathematics Curriculum and a scope and sequence chart with key content from each strand and sub-strand of the curriculum Foundation to Year 10.
- Mathematics curriculum and related elements are viewable in a number of different formats. A folio of annotated work samples is provided for each year level. The curriculum can be viewed as a whole or by selected parts as desired.
- The curriculum can be downloaded in PDF format, selecting the elements to download as desired.
- Clickable links connect the mathematics curriculum with the general capabilities and teaching resources.
- A glossary of key mathematical terms used in the curriculum can be downloaded in PDF format.
- The website is PC and tablet friendly.
- The senior secondary Years Curriculum is accessible from the same introductory page.

The features of the Australian Curriculum: Mathematics documentation provide ready access to the intended curriculum. The Australian Curriculum: Mathematics website elements contribute to making the curriculum documentation flexible and user friendly for students, teachers and parents. This will assist effective school community engagement.

Components of the Australian Curriculum: Mathematics

Achievement standards

At each year level aspects of the proficiencies and the mathematical content are evident in the achievement standards. Advice about the use of achievement standards states that:

An achievement standard describes the quality of learning (the extent of knowledge, the depth of understanding, and the sophistication of skills) that would indicate the student is well placed to commence the learning required at the next level of achievement².

Student work samples play a key role in communicating expectations described in the achievement standards.

The description of the achievement standard and the accompanying set of annotated work samples together provide a resource for teachers to use to make judgments about whether students have achieved the standard.

Achievement standards: Years 7-10

Achievement standards are given for levels Foundation to Year 10. There are no achievement standards for 10A content.

Each Year 7 number and algebra sub-strand is represented in the achievement standards. The sample portfolio of student work contains seven work samples. The achievements standards that are covered in these work samples are very explicit. Three different standards of work are given for each task. The achievement standards and the specific aspects of them that a task addresses are given at the beginning of each work sample. A sample may address standards from different strands. The annotations identify the parts of the achievement standards addressed throughout the task and include some qualitative comments. Some of the annotations do not use accurate mathematical language. For example the task for Number and Algebra—Algebra and the Cartesian Plane, (Below Satisfactory Portfolio) the annotation ‘Simplifies simple algebraic equations with one variable’, seems to refer to expressions and not equations. The closest achievement standard is likely to be ‘Students solve simple linear equations....’

At each year level the achievement standards are arranged into two paragraphs. Each content strand is referred to in each paragraph. This organisation requires some searching to make a judgment about achievement in a particular content strand. Rearranging the achievement descriptors into content strands could provide greater support in making judgments of student achievement.

The importance of engaging students in mathematical thinking within the content has been acknowledged in the curriculum comparison documents used in this review as a contributing factor to student success. Each proficiency strand is represented to some degree in the achievement standards. There is, however, scope for deepening the representation of some important aspects of the proficiencies within the achievement standards. For example, the Year 8 description of the reasoning proficiency includes ‘justifying the result of a calculation or estimation as reasonable’. Developing the ability to justify is an important factor in developing understanding and is a precursor to proving. The achievement standard for Year 8 includes ‘students use efficient mental and written strategies to carry out the four operations with integers’. This is also important and should be part of the achievement standard. However, if the standard included ‘and explain their result’ a stronger link to the proficiency could be made.

² <http://www.australiancurriculum.edu.au/mathematics/achievement-standards>, accessed 11/06/2014

The type of achievement standard found in the Australian Curriculum: Mathematics requires an understanding of requirements in the following year to make a judgment of student achievement. Adequate guidance is given for teachers to make this determination. For example, in the sub-strand of chance: at Year 7 students need to find sample spaces for simple experiments with equally likely outcomes and assign probabilities, whereas at Year 8 students choose appropriate language to describe events, identify complementary events and calculate the sum of probabilities. The level of complexity described in the achievement standards increases in a similar manner in subsequent years.

Consideration could be given to expanding the Year 10 achievement standards to include the optional content covered in 10A. Accompanying work samples could greatly assist in making a judgment of readiness to progress to senior secondary courses. The complexity of creating standards for optional content is acknowledged.

Achievement standards: senior secondary

The achievement standards describe the quality of learning expected. Five levels of learning are described for each subject. The achievement standards are presented in a rubric or grid format under headings of Concepts and Techniques for rubric one and Reasoning and Communication for rubric two. Achievement standards are given for units 1 and 2 together and similarly for units 3 and 4. The descriptions of the level and depth of the learning required align well with the content descriptions. The five levels of learning for each of the four qualitative descriptions of each rubric can be used in communication with parents and students and as a guide in school based assessment. For example, Mathematical Methods Units 1 and 2, the distinction between an 'A' and 'B' for Concepts and Techniques is based on the variety of contexts in which the skills can be applied. The distinction between a 'B' and 'C' is based on being able to solve non-routine problems as well as routine problems. It would be expected that more than one type of assessment task would contribute to the overall unit evaluation. Increasing the number of points on a scale makes it difficult to describe the difference between each point in a meaningful way.

General capabilities

The Australian Curriculum includes general capabilities that aim to 'encompass the knowledge, skills, behaviours and dispositions that, together with curriculum content will assist students to live and work successfully in the twenty-first century.'

There are seven general capabilities:

- literacy
- numeracy
- information and communication technology (ICT) capability
- critical and creative thinking
- personal and social capability
- ethical understanding
- intercultural understanding.

The Australian Curriculum: Mathematics explains that:

The general capabilities are identified wherever they are developed or applied in content descriptions. They are also identified where they offer opportunities to add depth and richness to student learning through content elaborations. Icons indicate where general capabilities have been identified in Mathematics content. Teachers may find further opportunities to incorporate explicit teaching of the capabilities depending on their choice of activities.

Cross-curriculum priorities

The three cross-curriculum priorities, Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia, and sustainability are identified wherever 'they are developed or applied in content descriptions, where they offer opportunities to add depth and richness to student learning in content elaborations'. The cross-curriculum priorities identify meaningful contexts in which to situate learning and serve a very different purpose to the general capabilities.

The Australian Curriculum: Mathematics describes the intended implementation of the cross-curriculum priorities:

The priorities provide dimensions which will enrich the curriculum through development of considered and focused content that fits naturally within learning areas. Cross-curriculum priorities are addressed through learning areas and are identified wherever they are developed or applied in content descriptions. They are also identified where they offer opportunities to add depth and richness to student learning in content elaborations.

Soundness of the general capabilities and cross-curriculum priorities

The soundness of the general capabilities and cross-curriculum priorities is judged by the extent to which they have been linked to the curriculum content at Years 7-10.

At each year level there is a substantial number of links to the general capabilities. The Years 7 and 10 content and elaborations each have well over 100 links to general capabilities. At Years 8 and 9, there are just under 70 links for each level.

The codes for each content description are also linked to resources in the Scootle website. At each year level the greatest number of links is to Critical and creative thinking. The elements of Critical and creative thinking are:

- generating ideas, possibilities and actions
- inquiring-identifying, exploring and organising information and ideas
- reflecting on thinking and processes
- analysing, synthesising and evaluating reasoning and procedures

These organising ideas can be seen in the description of the mathematical proficiency 'Reasoning', where students develop their capacity for logical thought and actions. The reasoning description contains aspects of each of the four organising elements of critical and creative thinking. For example, 'students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached....' implies aspects of organising, reflecting, analysing, synthesising and evaluating.

The frequent reference to the numeracy capability is also evident in the mathematical proficiencies, particularly the proficiencies of fluency and reasoning.

There is a strong reference to the ICT capability in Year 10 content descriptions, less so in the other levels. At Years 7 and 8 the links occur mainly in content descriptions such as 'Solve problems involving profit and loss, with and without digital technologies' (Investigating with ICT, managing and operating ICT).

Links to the literacy capability are evident at all year levels. In Year 7 these links are mainly to word knowledge (11) and comprehending texts (8). Given the specific use of language in mathematics this link should be expected and indeed supports the content statements in the development of appropriate mathematical language.

Literacy, numeracy, ICT and critical and creative thinking capabilities have all been linked to the Mathematics curriculum content in a meaningful and quite extensive way. The links are individually accessed via icons which lead to a brief description of the elements. They provide an accessible resource to support the development of good lessons. The quality and integration of these general capabilities is high.

The general capabilities focus on the skills that are needed for learning. The descriptions identify places where the capabilities could be developed within the curriculum. In the main these have been well done.

Embedding the cross-curriculum priorities

In Australian Curriculum: Mathematics Years 7-10 limited reference is made to the cross-curriculum priorities, with a total of just 13 references across the four years of schooling. The low number of references in the Australian Curriculum: Mathematics suggests that, if the cross-curriculum priorities are to have a meaningful impact on student learning in mathematics, there is a need for more extensive identification of where they can fit naturally within the mathematical content. The resources that are provided for each of the content descriptions linked to Scootle offer ideas for engaging with the mathematics in a meaningful way in context. The opportunity for mathematics to be used in context is important for student engagement and deep learning, but it could be argued that the impact of the cross-curriculum priorities will be minimal with so few links.

In the Australian Curriculum: Mathematics 7-10 the cross-curriculum priorities do not detract from the curriculum, but the level of integration is low.

Analysis of the Australian Curriculum Mathematics

Robustness

This section considers the academic rigour, structure and sequencing, detail, clarity, succinctness and design of the Australian Curriculum: Mathematics.

The Australian Curriculum: Mathematics levels 7-10 content organising strands and sub-strands provide a consistent structure across the lower secondary curriculum. The primary curriculum is based on the same structure. Content is generally sequenced in a manner that fosters a deepening

of understanding, although the timing of introducing some content could be adjusted to allow for tighter connections between the strands and deeper development of some key concepts. For example, Year 6 Measurement and Geometry content description ‘Solve problems involving the comparison of lengths and areas’ ... (ACMMG 137) connects to number work in Year 7 ‘investigate and use square roots of perfect square numbers (ACMNA150)’. The investigation described in ACMNA150 is contained in ‘investigate index notation (ACMNA 149)’ where opportunity exists for a much deeper investigation. ACMNA150 could be covered at Year 6. The curriculum comparisons that follow provide further examples.

A closer link between the proficiency strands as described in the Australian Curriculum: Mathematics *Organisation* and the year level descriptions of the proficiencies could deepen the focus of mathematical thinking in the content descriptions and the achievement standards. For example Year 7 level description includes ‘Apply(ing) number laws to calculations’ could also include and ‘explain their choices’ which is part of the overall description of reasoning. This could further support the intention that the proficiency strands ‘are integral parts of mathematics content across the three content strands’. The achievement standard could be written to support this and other similar inclusions.

The Australian Curriculum: Mathematics provides a high level of rigour. The core mathematics for the strands reviewed compare favourably with USA CCSS and Japan COS. The content descriptions are organised in a consistent way. They use the language of the proficiencies and in this way they support the intent to work mathematically within the content. There are some key differences between the Australian Curriculum: Mathematics and the comparison countries in the way and timing that concepts are introduced in linear and non-linear relations. Examples are provided in the curriculum comparison that follows. The level of algebraic skills developed by the end of Year 9 is similar to Japan COS. Opportunities to strengthen the preparation provided by the Australian Curriculum: Mathematics exist through the strengthening of the mathematical focus of the elaborations, particularly in the number and algebra strand. Examples are provided in the curriculum comparisons that follow.

Balance

In considering the balance of Australian Curriculum: Mathematics content, this analysis considered the core knowledge, concepts and themes of the content described and any bias, selectiveness and emphasis. The comparison of curricula reveals significant similarities of content and emphasis amongst them, with the differences mainly about allocation to year levels and some differences of emphasis at particular points. Given the breadth of coverage of core content in the Australian Curriculum: Mathematics and the similarity of content and standards between the Australian Curriculum: Mathematics and other curricula, there is little if any evidence of selectivity or bias. The interweaving of the proficiencies through the content descriptions, elaborations and achievement standards emphasises the importance of providing a balance in type of interactions that students have with the content.

Choice and Flexibility

Choice and flexibility in the Australian Curriculum: Mathematics structure and content refers to how well it allows selection of courses and classroom delivery for students within different contexts and stages of schooling.

The Australian Curriculum: Mathematics implementation advice to teachers states that:

Teachers use the Australian Curriculum content and achievement standards first to identify current levels of learning and achievement and then to select the most appropriate content (possibly from across several year levels) to teach individual students and/or groups of students. This takes into account that in each class there may be students with a range of prior achievement (below, at, and above the year level expectations) and that teachers plan to build on current learning.

In this way the intended curriculum at lower secondary levels provides flexibility in classroom delivery. The flexibility is evident not through selection of classes, but rather through the delivery within the class. Links to resources further support the selection of appropriate content.

In Australian Curriculum: Mathematics F-10 a scope and sequence chart provides an overall snapshot view of learning across the year levels in each strand to support teachers in choosing appropriate content. At upper secondary levels specific courses have been developed to meet student need. The format of the Australian Curriculum: Mathematics document appears to limit the number of elaborations. Developing some aspects of the elaborations could enhance the overall strength of the Australian Curriculum: Mathematics. Examples of how the elaborations could be developed in number and algebra are provided in the curriculum comparison.

Student response

The extent to which the curriculum for mathematics encourages positive responses from students, a love of learning, joy of discovery, and a quest for knowledge and skills is most clearly influenced by the learning experiences of students and the pedagogical approaches used by the teacher. The range of topics and levels of understanding at each level in the Australian Curriculum: Mathematics gives the opportunity for teachers to make mathematics absorbing by using appropriate examples, applications, discovery approaches and investigations. The Australian Curriculum: Mathematics content per se provides no barrier to strong student engagement in the right learning environment, and the provision of online links gives teachers useful resources and ideas to help make mathematics appealing.

Curriculum comparison

Comparison Curricula

Four international curricula were examined for the purposes of this analysis: USA CCSS, the Japanese COS (Mathematics), the Ontario Curriculum and the Finnish National Core Curriculum for Upper Secondary Schools 2003.

The Common Core State Standards

In TIMSS 2011 Mathematics the mean score for the USA sample ranked 9th out of 45 participating countries and regions.

Japanese Course of Study

In TIMSS 2011 Mathematics the mean score for the Japanese sample ranked 5th out of 45 participating countries and regions. The translation of the Japanese Course of Study (Japan COS) used in this report is that of A Takahashi, T Watanabe and M Yoshida. This report uses the Years 7-9 curriculum in the curriculum comparison exercises. Objectives and content are provided for each grade. This translation describes the Japan COS Years 7-9 in approximately 10 pages.

Finnish National Core Curriculum for Upper Secondary Schools

In TIMSS 2011 Mathematics the mean score for the Finnish sample ranked 8th out of 45 participating countries and regions. The national core curriculum is determined by the Finnish National Board of Education. It includes the objectives and core contents of different subjects, as well as the principles of pupil assessment, special-needs education, pupil welfare and educational guidance. The principles of a good learning environment, working approaches as well as the concept of learning are also addressed in the core curriculum. The National Core Curriculum for Upper Secondary Schools was reformed in 2003 and came into effect on 1 August 2005. The national core curriculum is currently being reformed and the new curriculum will be introduced in August 2016. At Upper Secondary Advanced level there are 10 compulsory courses and two specialisation courses. At Basic level there are six compulsory and two specialisation courses.

Ontario Curriculum

Ontario, a benchmarking participant in TIMSS 2011, was one of only four benchmarking participants to increase its achievement level in Year 8 Mathematics. The Ontario Curriculum for Grades 9-12 is published by the Ministry of Education. Ontario has consistently improved performance in the publicly funded education system over the last decade. Providing opportunity for every student to succeed is a fundamental principle of the system. The mathematics courses available in the upper secondary years support continued growth in mathematical understanding for many pathways.

Years 9 and 10: The document used for this review was implemented in September 2005. All Grades 9 and 10 mathematics courses are based on the expectations outlined in the document. There are content descriptions for an Academic and Applied course for each year level. General mathematics curriculum and planning advice is also contained in the 59 page document.

Years 11 and 12: Beginning in September 2007, all Grades 11 and 12 mathematics courses are based on the expectations outlined in the document used for review. The curriculum document for Years 11 and 12 is structured in a similar way to that of Years 9 and 10. There are four courses of study available for Grade 11 and six courses of study at Grade 12. The advice and curriculum content for all Grades 11 and 12 courses are provided in a 155 page document.

Features of the Lower Secondary Curricula

Structure

Structure of the Australian Curriculum: Mathematics Years 7-10

As with the Primary years, Australian Curriculum: Mathematics Years 7-10 uses three major organising headings or strands. Sub-strands are used to further organise the content. Not all sub-strands continue across all levels. Table 4.1 provides a summary of the levels where specific sub-strands apply through the Foundation to Year 10 Australian Curriculum: Mathematics.

Table 4.1: Structure of the Australian Curriculum: Mathematics

Number and Algebra	Measurement and Geometry	Statistics and Probability
Number and place value (F-8)	Using units of measurement (F-10)	Chance (1-10)
Fractions and decimals (1-6)	Shape (F-7)	Data representation and interpretation (F-10)
Real numbers (7-10)	Geometric reasoning (3-10)	
Money and financial mathematics (1-10)	Location and transformation (F-7)	
Patterns and algebra (F-10)	Pythagoras and trigonometry (9-10)	
Linear and non-linear relationships (7-10)		

Structure of the USA CCSS

USA CCSS has 5 organising headings at each of grade 7 and grade 8. The headings that apply across both levels are: The Number System, Expressions and Equations, Geometry, and Statistics and Probability. Ratio and Proportional Relationships, studied at Grade 7, does not continue into Grade 8, where students begin the study of Functions. Under each heading there are several content statements with detailed elaborations of what it is intended that students understand and do. The documents also include Mathematics: Standards for Mathematical Practice. The standards describe processes and proficiencies that educators should seek to develop in their students.

Structure of the Japanese COS (Mathematics) for Years 7-9

The structure of the Japan COS is consistent across primary curriculum and lower secondary levels. Each grade level starts with a statement containing four learning objectives. The lower secondary content is organised under four subheadings: Numbers and Mathematical Expressions, Geometric Figures, Functions, and Data Handling. These categories are closely related to those used in the primary grades. The objectives include aspects of the curriculum that it is intended students will deepen their understanding of as well as particular mathematical skills to focus on. Some advice is given on the construction of teaching plans and a small number of remarks concerning the content. The content statements are largely written as statements of understanding. For example at Grade 9

‘Students will understand the square roots of positive whole numbers and use them in representations and explorations’. Three brief elaborations follow where computational skills as well as understanding are referred to.

Detail of Advice Provided

The Australian Curriculum: Mathematics document on the ACARA website was examined. The PDF version of the content descriptions for Years 7 to 10 (including content for 10A) is 19 pages in length. The version containing year level proficiencies, content descriptions, elaborations and achievement standards is 27 pages in length. Work sample portfolios to accompany the achievement standards are available for each year level in PDF format.

Japanese Course of Study

The translation of the Japanese Course of Study (Japan COS) used in this report is that of A. Takahashi, T. Watanabe and M. Yoshida. This report uses the Years 7-9 curriculum in the curriculum comparison exercises. Objectives and content are provided for each grade. This translation describes the Japan COS Years 7-9 in approximately 10 pages.

The Common Core State Standards

The Common Core State Standards (USA CCSS) describe the mathematics curriculum up to the Year 8 equivalent level. A 20-page document describes the Grade 7 and 8 Mathematics Curriculum.

Finnish National Core Curriculum for Upper Secondary Schools

The specific Mathematics curriculum content and advice for upper secondary Mathematics, advanced syllabus and Mathematics, basic syllabus are contained in a document of 11 pages.

Ontario Curriculum

Years 9 and 10: General mathematics curriculum and planning advice is also contained in the 59 page document.

Years 11 and 12: There are four courses of study available for Grade 11 and six courses of study at Grade 12. The advice and curriculum content for all Grades 11 and 12 courses are provided in a 155-page document.

Discussion

All three documents provide a structure where key concepts and skills are organised in a similar way from one grade to the next. The organisation at lower secondary is closely related to the primary organisation. A logical progression of content is evident in all documents. Connections are made between year levels and between content strands. Thus in each intended curriculum there is structure and cohesion.

The Australian Curriculum: Mathematics has a strong organising structure and in most cases the content is carefully sequenced. Some key ideas in linear and non-linear relationships such as using the properties of equality to solve linear equations could be elaborated more explicitly. One key difference between the Australian Curriculum: Mathematics and other documents is in the development of the concept of a function. USA CCSS and Japan COS introduce the notion of function informally over a number of years and at Year 8 begin interpreting linear equations in two variables

as functions. The Australian Curriculum: Mathematics leaves the formal introduction to functions until much later without significant explicit informal development of the concept.

The Japan COS is strongest in terms of sequencing, succinctness, timing of introduction of new concepts and clarity of identification of important mathematical concepts to be learned.

Japan COS is very clearly set out, where the key organising ideas that need to be developed at each year level are explicitly stated in the year level objectives. The objectives demonstrate a clear progression in the development of understanding. The content descriptions that follow are carefully sequenced, mostly expressed as understandings, but do include key procedures that students are expected to use. The elaborations are mathematical rather than pedagogical or contextual and generally point to important aspects of key underlying concepts and skills. Some brief advice is given at the end of each level description on important aspects of the mathematical activities to be engaged. The succinctness and clear structure of the document and the careful way that concepts are focused on provides a high level of rigour in most topics. The course of study for probability is not as comprehensive as other areas. Japan COS does not provide any significant advice on planning or sequencing of lessons within topics.

USA CCSS is carefully sequenced. The elaborations point to the key mathematical ideas and unlike the Japan COS they provide a number of examples to illustrate the type of problems students are expected to be able to do. USA CCSS provides the most description of what students need to learn. The document is quite long, with a possible risk that providing as many examples will unintentionally reduce the focus on developing deep understanding through the exploration of the content. However, when compared to the Australian Curriculum: Mathematics and Japan COS, there is more guidance in the USA CCSS for teachers regarding what it is that students are expected to learn. In Years 7 and 8 the content covered in number and algebra is similar to Japan COS, however the USA CCSS covers more than Japan COS in statistics and probability.

The connections between content areas that are privileged are different in some cases. For example, both the Japan COS and USA CCSS privilege understanding of functions at Year 8. The Australian Curriculum: Mathematics requires a similar level of algebraic skills, but the conceptual emphasis is different. Australian Curriculum: Mathematics Year 10 and 10A content provide a sound overall basis for high level study of functions. The 10A content related to functions does not include informal study of the features of functions. The features of functions are examined in depth in Unit 1 Mathematical Methods. For these reasons it could be argued that the Australian Curriculum: Mathematics does not provide the same level of preparation for higher level study of functions as Japan COS and USA CCSS. It should be noted however that the Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics compare very favourably with Finland Upper Secondary advanced mathematics courses in the study of functions.

The documents all provide some advice for teachers on the important aspects of the content, but differ in the extent of the detail provided. The Japan COS is brief. The implementation of the intended curriculum described in Japan COS relies on the teacher having deep pedagogical content knowledge. The Ministry of Education, Culture, Sports Science and Technology in Japan (MEXT) also seeks to ensure the quality and standard of textbooks. USA CCSS provides a number of mathematical

elaborations and specific examples of problems for each content statement. The Australian Curriculum: Mathematics includes elaborations to illustrate and exemplify content and assist teachers to develop a common understanding of the content descriptions. These elaborations provide less detail than USA CCSS but in many cases more than COS. The elaborations in all three documents play an important role in communicating the key features of the mathematics to be studied and in this sense are a key contributor to the robustness of the curriculum. Some Australian Curriculum: Mathematics elaborations do not add to the mathematical clarity of what students are expected to learn, instead providing contextual or resource advice. For example, Year 7 'identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)' has an elaboration 'obtaining data from newspapers, the Internet and Australian Bureau of Statistics'. This elaboration provides a suggestion on sourcing secondary data, but is not a mathematical elaboration. A mathematical elaboration may refer to issues such as distinguishing types of data, and sampling when a large amount of data is sourced.

The different styles of documents each provide their own challenges in implementing the intended curriculum. Japan COS is clear, brief and focuses on the important mathematical concepts and skills. It relies heavily on the user being able to interpret or use other resources to elaborate and develop lesson plans. USA CCSS provide significant examples that demonstrate much of the important mathematics and contexts. There is a risk that detailed advice of this nature could be interpreted that everything is covered and some of the richness of mathematics consequently lost. Australian Curriculum: Mathematics content descriptions provide an ordered approach to learning, but 'a concept introduced at one level may be revisited, strengthened and extended at later years as needed'. This allows the document to be concise, but requires knowledge of content across many year levels and an ability to know when and how to deepen understanding. As described in other sections of this report, the elaborations could be developed to strengthen the mathematical interpretation of the content descriptions.

Thinking Mathematically

All three documents express the importance of thinking mathematically. At the secondary level the Australian Curriculum: Mathematics promotes the significance of working mathematically within the content and describes how the content is explored or developed. The proficiencies provide the language to build in the developmental aspects of the learning of mathematics. Clear general statements that describe the proficiencies are provided. Included in each year level statement is a description of the proficiencies as they apply to the mathematical content at that level.

For example, at Year 7: 'Reasoning includes applying the number laws to calculations, applying known geometric facts to draw conclusions about shapes, applying an understanding of ratio and interpreting data displays'.

This description directly connects to 'Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)', 'Describe and interpret data displays using median, mean and range (ACMSP172)' and 'Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)'.

At Year 9 Reasoning includes: ‘following mathematical arguments, evaluating media reports and using statistical knowledge to clarify situations, developing strategies in investigating similarity and sketching linear graphs’.

A strong link is made to ‘Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians’ (ACMSP227) and ‘Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220) ‘ as well as ‘Solve problems using ratio and scale factors in similar figures (ACMMG221)’.

‘Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)’ clearly identifies the need for students to sketch linear graphs, but the connection to reasoning as a type of interaction with the curriculum is not as strong as in the previous examples.

The Australian Curriculum: Mathematics has a clear intent that the proficiencies are clearly evident in the content descriptions. Additional work to make the proficiencies more explicit and evident could further strengthen this important aspect of what it means to engage in mathematical thinking.

The Australian Curriculum: Mathematics further promotes the importance of mathematical thinking by embedding aspects of the proficiencies achievement standards for each level.

The USA CCSS has ‘Standards for Mathematical Practice’ that ‘describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important ‘processes and proficiencies’ with longstanding importance in mathematics education’.

The eight standards are:

1. make sense of problems and persevere in solving them
2. reason abstractly and quantitatively
3. construct viable arguments and critique the reasoning of others
4. model with mathematics
5. use appropriate tools strategically
6. attend to precision
7. look for and make use of structure
8. look for and express regularity in repeated reasoning.

A three-page description of the Standards for Mathematical Practice is included in the USA CCSS document. These descriptions apply to all levels of the curriculum.

Japan COS relies on objectives for the lower secondary school to achieve the goal of integrating the importance of thinking mathematically in the content. The general objectives are:

Through mathematical activities, students will (1) deepen their understanding of principles and rules about numbers, quantities, and geometric figures, (2) develop fluency for mathematical representations and procedures, and (3) foster the disposition to utilise their mathematical understanding, representations and procedures in reasoning and making judgments.

There are specific objectives for each level to further support the general ones.

The intent that mathematical thinking is embedded in the learning of mathematics is clear in each document, although it is done in a different way.

Rigour

The intent expressed in the Australian Curriculum: Mathematics, COS and USA CCSS is to foster a deep level of understanding of the mathematics content as well as procedural efficiency and competency. This intent is evident in places such as the rationale, teaching advice, objectives and elaborations of content. The USA CCSS provides detailed elaborations of the mathematical content and some contextual examples. The Japan COS elaborations focus closely on the key mathematical content. Elaborations in the Australian Curriculum: Mathematics are mainly mathematical in nature but can be less explicit about the key ideas that are important for conceptual development. For example, Japan COS, the Year 7 linear equations content statement is 'Students will understand equations and be able to use linear equations in their inquiries'; one of the supporting statements or elaborations is 'To understand that equations may be solved by using the properties of equality'. The Australian Curriculum: Mathematics has a similar content statement 'Solve simple linear equations (ACMNA179)' where one of the elaborations is 'solving equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation using substitution to check solutions'. This type of elaboration does not convey the mathematical importance of the concept of equality to the same degree as the Japan COS.

The Australian Curriculum: Mathematics Years 10 and 10A content is designed to provide a suitable preparation for any of the pathway options in the senior secondary mathematics courses. The 10A content is optional but advantageous for students intending to study Mathematical Methods or Specialist Mathematics. A high level of understanding is required to complete the content described in the sub-strand 'Linear and non-linear relationships'. The Year 10 and 10A combined content provides a solid foundation for the Mathematical Methods Unit 1 Functions and Graphs. However opportunities exist to strengthen the preparation for the study of functions throughout the secondary Australian Curriculum: Mathematics. Experience in modelling relationships between quantities, making the connections between writing equations in words, writing equations using symbols, tables of values and graphs all contribute the development of the deep understanding desired for successful study of high level mathematics. In the lower secondary years the content that is already described could be more closely connected to study of functions. For example in Year 7 'Investigate, interpret and analyse graphs from authentic data (ACMNA180)' and the accompanying elaborations 'using travel graphs to investigate and compare the distance travelled to and from school' and 'interpreting features of travel graphs such as the slope of lines and the meaning of horizontal lines' could be explicitly connected with a mathematical focus to the essential understanding needed for formal study of functions. A simpler context than travel graphs could be chosen to begin this study. Similar opportunities exist in Year 8 content to strengthen the focus of the elaborations on the important mathematical features. At Year 10 students 'Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239)'. This content provides

an ideal opportunity to begin the informal exploration of features of functions. However, a specific focus on features of functions, as distinct from relations, is not elaborated.

Consideration could be given to reviewing the use of the elaborations to include a greater focus on the development of key concepts, such as the understanding of functions, needed for further study in mathematics.

Flexibility

In all three countries advice is given regarding the place and purpose of mathematics in the curriculum. Within this advice the need to equip students with essential mathematical knowledge and the ways that students learn is acknowledged. The need to differentiate to meet student need is a teacher responsibility. Teachers need to plan to build on current learning. The Australian Curriculum: Mathematics senior secondary courses provide considerable choice to meet the needs of students. Table 4.2 illustrates the variety of learning pathways students can choose in their upper secondary mathematics learning.

Table 4.2: Pathways students can choose in their upper secondary mathematics learning

Australian Curriculum Year 10 and 10A Senior secondary Mathematics subjects: Essential Mathematics, General Mathematics, Mathematical Methods, Specialist Mathematics	
Ontario Courses in Grade 9 and Grade 10 Principles of Mathematics (Academic) Foundations of Mathematics (Applied) Ontario Courses in Grade 11 and Grade 12 Four types of courses are offered in the senior mathematics program: university preparation, university/college preparation, college preparation, and workplace preparation. Students choose course types on the basis of their interests, achievement, and postsecondary goals.	Finland Upper Secondary (roughly equivalent to Years 10-12) Mathematics, Advanced Syllabus Mathematics, Basic Syllabus

In Finland and Ontario students choose courses at the Years 9/10 level or equivalent. There is some allowance within the course structures to cater for students changing pathways. In Australian Curriculum: Mathematics Year 10A provides optional additional content for students intending to pursue Mathematical Methods or Specialist Mathematics in senior secondary. Similar options are not available at Year 9. Year 9 Australian Curriculum: Mathematics provides a broad study of mathematics and a suitable preparation for any senior secondary Mathematics course. There is scope within the content to cater for different student need. For example, ‘Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP282)’ can easily be varied in complexity to provide access for all students to develop an understanding and appreciation of the importance of being able to interpret data displays. Similarly, ‘find the distance between two points located on the Cartesian plane using a

range of strategies, including graphing software (ACMNA214)' can be met in a variety of ways and contexts.

Each system has acknowledged that there is a need to provide ongoing opportunities to learn mathematics in the upper secondary years of schooling. The Australian Curriculum: Mathematics and Ontario have provided flexibility in the number and type of courses available, whilst Finland offers fewer course options with flexibility provided through a structure of several compulsory modules and a small number of optional modules. Notably both Ontario and the Australian Curriculum: Mathematics provide a course that focuses on preparing students for the workplace and further training, thus acknowledging the important place of using mathematics in the workplace and everyday life.

Comparison of Years 7-9 Curricula

Case 1: Patterns and algebra/Linear and non-linear relationships

Table 4.3: Patterns and algebra – Year 7

Year 7 Australian Curriculum: Mathematics	
<p><u>Patterns and algebra</u></p> <p>Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)</p> <ul style="list-style-type: none"> understanding that arithmetic laws are powerful ways of describing and simplifying calculations and that using these laws leads to the generality of algebra <p>Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)</p> <ul style="list-style-type: none"> using authentic formulas to perform substitutions <p>Extend and apply the laws and properties of arithmetic to algebraic terms and expressions</p> <ul style="list-style-type: none"> identifying order of operations in contextualised problems, preserving the order by inserting brackets in numerical expressions, then recognising how order is preserved by convention moving fluently between algebraic and word representations as descriptions of the same situation 	
Year 7 USA CCSS	Year 7 Japan COS
<p>Use properties of operations to generate equivalent expressions</p> <ul style="list-style-type: none"> Apply properties of operations as strategies to add, subtract, factor, and expand linear expression with rational coefficients Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. <i>For example, $a + 0.05a = 1.05a$ means that 'increase by 5%' is the same as 'multiply by 1.05.'</i> 	<p>Students will understand positive and negative numbers through their experiences in everyday situations. They will develop the fluency to calculate with positive and negative numbers, as well as develop their ability to reason about and represent positive and negative numbers.</p> <ul style="list-style-type: none"> To understand the need for and the meaning of positive and negative numbers. To understand the meaning of the four arithmetic operations with positive and negative numbers by relating them to what they studies in the elementary grades. To be able to calculate with positive and negative numbers. To represent and process real-life situations using positive and negative numbers.

Table 4.4: Linear and non-linear relationships – Year 7

Year 7 Australian Curriculum: Mathematics

Linear and non-linear relationships

Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)

- plotting points from a table of integer values and recognising simple patterns, such as points that lie on a straight line

Solve simple linear equations (ACMNA179)

- solving equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation using substitution to check solutions
- investigating a range of strategies to solve equations

Investigate, interpret and analyse graphs from authentic data (ACMNA180)

- using travel graphs to investigate and compare the distance travelled to and from school
- interpreting features of travel graphs such as the slope of lines and the meaning of horizontal lines
- using graphs of evaporation rates to explore water storage

Year 7 USA CCSS	Year 7 Japan COS
<p>Solve real-life and mathematical problems using numerical and algebraic expressions and equations</p> <ul style="list-style-type: none"> Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the centre of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54cm. Its length is 6cm. What is its width? Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. 	<p>Students will be able to represent relationships and rules involving numbers and quantities using mathematical expressions with letters. Students will also foster their ability to interpret mathematical expressions and to operate with mathematical expressions.</p> <ul style="list-style-type: none"> To understand the need for and meaning of using letters in mathematical expressions. To be able to multiply and divide mathematical expressions with letters. To be able to add and subtract simple linear expressions. To understand that relationships and rules involving numbers and quantities may be represented in mathematical expressions with letters, and to be able to write and interpret mathematical expressions with letters. <p>Students will understand equations and be able to use linear equations in their inquiries.</p> <ul style="list-style-type: none"> To understand the need for and the meaning of equations, and to understand the meaning of letters in equations and solutions of equations. To understand that equations may be solved by using the properties of equality. To be able to solve simple linear equations, and to use linear equations in real-life situations. <p>Students will deepen their understanding of direct and inverse proportional relationships by examining correspondences and variations of two quantities in real-life situations; students will foster their ability to identify, represent, and examine functional relationships.</p> <ul style="list-style-type: none"> To understand the meaning of functional relationships.

Year 7 Australian Curriculum: Mathematics

rare specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.

- To understand the meaning of direct and inverse proportional relationships.
- To understand the meaning of the coordinates.
- To understand the characteristics of direct and inverse proportional relationships and be able to represent the relationships using tables, mathematical expressions and graphs.
- To be able to identify direct or inverse proportional relationships in concrete situations and be able to explain them.

Table 4.5: Patterns and algebra - Year 8

Year 8 Australian Curriculum: Mathematics

Patterns and algebra

Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190)

- applying the distributive law to the expansion of algebraic expressions using strategies such as the area model

Factorise algebraic expressions by identifying numerical factors (ACMNA191)

- recognising the relationship between factorising and expanding
- identifying the greatest common divisor (highest common factor) of numeric and algebraic expressions and using a range of strategies to factorise algebraic expressions

Simplify algebraic expressions involving the four operations (ACMNA192)

- understanding that the laws used with numbers can also be used with algebra

Year 8 USA CCSS	Year 8 Japan COS
<p>Work with radicals and integer exponents.</p> <ul style="list-style-type: none"> • Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.</i> • Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. • Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger. • Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimetres per year for seafloor spreading). Interpret scientific notation that has been generated by technology. 	<p>Students will be able to identify relationships of quantities in concrete phenomena and will be able to represent and interpret these relationships in mathematical expressions with letters. Students will be fluent with the basic arithmetic of literal expressions.</p> <ul style="list-style-type: none"> • To be able to add and subtract polynomials; to be able to multiply and divide monomials. • To understand that mathematical expressions with letters may be used to capture and explain relationships among quantities.

Table 4.6: Linear and non-linear relationships - Year 8

Year 8 Australian Curriculum: Mathematics

Linear and non-linear relationships

Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193)

- completing a table of values, plotting the resulting points and determining whether the relationship is linear
- finding the rule for a linear relationship

Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194)

- solving real life problems by using variables to represent unknowns

Year 8 USA CCSS	Year 8 Japan COS
<p>Understand the connections between proportional relationships, lines, and linear equations.</p> <ul style="list-style-type: none"> Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i> Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. <p>Analyse and solve linear equations and pairs of simultaneous linear equations. Solve linear equations in one variable.</p> <ul style="list-style-type: none"> Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. <p>Analyse and solve pairs of simultaneous linear equations.</p> <ol style="list-style-type: none"> Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i> Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i> <p>Define, evaluate, and compare functions.</p> <ol style="list-style-type: none"> Understand that a function is a rule that assigns to each input exactly 	<p>Students will understand linear functions by analysing the change and correspondences of two quantities identified in concrete situations, while developing their ability to represent and analyse functional relationships.</p> <ul style="list-style-type: none"> To know that some phenomena may be characterised by linear functions. To understand and relate representations of linear functions, i.e., tables, mathematical expressions, and graphs.

Year 8 Australian Curriculum: Mathematics

one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

- b. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*
- c. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function*
- d. $A = s^2$ *giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*

Use functions to model relationships between quantities.

- a. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or table of values.

Describe qualitatively the functional relationship between two quantities by analysing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Table 4.7: Patterns and algebra - Year 9

Year 9 Australian Curriculum: Mathematics	
<p><i>Patterns and algebra</i></p> <p>Extend and apply the <u>index</u> laws to variables, using positive <u>integer</u> indices and the zero <u>index</u> (ACMNA212)</p> <ul style="list-style-type: none"> understanding that index laws apply to variables as well as numbers <p>Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213)</p> <ul style="list-style-type: none"> understanding that the distributive law can be applied to algebraic expressions as well as numbers understanding the relationship between expansion and factorisation and identifying algebraic factors in algebraic expressions 	
Year 9 USA CCSS	The USA CCSS courses of study are not part of this review. Content for Year 9 is provided under the High School Standards, where the content is organised by course rather than by year of study.
Year 9 Japan COS	
<p>Students will understand the square roots of positive whole numbers and use them in representations and explorations.</p> <ul style="list-style-type: none"> To understand the need for and the meaning of square roots. To be able to carry out simple computations involving square roots. To be able to use square roots to represent and process concrete situations. <p>Students will be able to expand and factor simple polynomials as well as modifying and interpreting mathematical expressions according to purposes.</p> <ul style="list-style-type: none"> To be able to multiply polynomials and monomials, and to be able to divide polynomials by monomials. To be able to multiply simple linear expressions, and to be able to expand and factor using the following formulas: $(a + b)^2 = a^2 + 2ab + b^2$ $(a - b)^2 = a^2 - 2ab + b^2$ $(a + b)(a - b) = a^2 - b^2$ $(x + a)(x + b) = x^2 + (a + b)x + ab$ To be able to capture and explain relationships of numbers and quantitative relationships. <p>Students will understand quadratic equations and be able to use them in explorations.</p> <ul style="list-style-type: none"> To understand the need for and the meaning of quadratic equations and their solutions. To solve quadratic equations by factoring and by completing squares. To learn the quadratic formula and use the formula to solve quadratic equations. To use quadratic equations in concrete situations. 	

Table 4.8: Linear and non- linear relationships - Year 9

Year 9 Australian Curriculum: Mathematics
<p><u>Linear and non-linear relationships</u></p> <p>Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software (ACMNA214)</p> <ul style="list-style-type: none"> investigating graphical and algebraic techniques for finding distance between two points using Pythagoras' theorem to calculate distance between two points <p>Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)</p> <ul style="list-style-type: none"> investigating graphical and algebraic techniques for finding midpoint and gradient recognising that the gradient of a line is the same as the gradient of any line segment on that line <p>Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)</p> <ul style="list-style-type: none"> determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra <p>Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296)</p> <ul style="list-style-type: none"> graphing parabolas, and circles connecting x-intercepts of a graph to a related equation
Year 9 Japan COS
<p>Students will understand functions in the form of $y = ax^2$ by analysing the change and correspondences of two quantities identified in concrete situations, while developing their ability to represent and analyse functional relationships.</p> <ul style="list-style-type: none"> To become aware that some phenomena may be considered using the function of the form, $y = ax^2$. To understand and relate representations of functions of the form $y = ax^2$, i.e., tables, mathematical expressions, and graphs. To grasp and explain concrete phenomena using functions of the form $y = ax^2$. To understand that functional relationships may be found in various phenomena.

Discussion

Mathematics is a connected discipline where organising ideas are important. There are many logical and effective ways to do this. It is not possible to include the full content of each strand of mathematics considered in this review due to overall length of the documents. In many cases connected content is outlined in alternative parts of the curriculum. In Number and Algebra there are differences in the way the content can be organised and concepts effectively developed. The Japanese COS, the USA CCSS and the Australian Curriculum: Mathematics have a number of similarities and differences. Importantly, there is evidence of strong organising and connecting threads in each document. In Number and Algebra the importance of understanding is emphasised in many places in each document. At Year 7 connecting number properties to algebra and linear relationships is an important aspect of all documents. Case 1 (refer to Tables 4.3 and 4.4) includes content from each curricula that is roughly equivalent to Year 7 Australian Curriculum: Mathematics patterns and algebra as well as linear and non- linear relationships. The USA CCSS and Japan COS objectives and content statements emphasise the importance of understanding proportional relationships in Years 7 and 8. Year 8 USA CCSS includes 'Understanding the connections between proportional relationships, lines and linear equations'. This content statement is elaborated to include the most important aspects of the mathematics. Japan COS content 'Students will

understand linear functions by analysing the change and correspondences of two quantities identified in concrete situations...' includes a similar emphasis. In the Australian Curriculum: Mathematics proportional relationships are not presented as an organising concept although opportunity to engage with them in the number content is present. Privileging proportional relationships as an organising concept provides the opportunity to develop understanding of functions at an earlier stage. By making more explicit connections between the existing content descriptions in the sub-strands of real number and linear and non-linear relationships, the Australian Curriculum: Mathematics could provide a vehicle to enhance and deepen understanding.

The representation of numbers by using a pronumeral in a mathematical expression is introduced in late primary school in the US CCSS and Japanese COS and at Year 7 in the Australian Curriculum: Mathematics. The Australian Curriculum: Mathematics continues to place a greater emphasis on the structure of number at this level. Having a strong foundation in number is essential for study of many mathematics concepts, including algebra. The Australian Curriculum: Mathematics needs to continue with a focus on number at Year 7, until there is evidence that it is no longer needed. Solving simple linear equations is an expectation across all documents. The Japanese COS explicitly states the importance of using and understanding the properties of equality to solve linear equations (refer to Table 4.4). The Australian Curriculum: Mathematics elaborations link the laws of arithmetic to algebra and expressing generality, however the elaborations for 'Solve simple linear equations' do not explicitly make the link to the properties of equality. US CCSS includes inequalities as part of linear relationships. Inequality is not an explicit part of the Australian Curriculum: Mathematics content at this level.

The overall level expected at the end of Year 7 in the sub-strands above is similar across Japan COS and the Australian Curriculum: Mathematics. USA CCSS content described is closer to the Year 8 level of the Australian Curriculum: Mathematics.

By the end of Year 8 Japanese COS and US CCSS introduce students to interpreting the equation $y=ax+b$ as a linear function whose graph is a straight line. The concept of function is not considered explicitly in this way in the Australian Curriculum: Mathematics until Year 10. A comparison of the content in Tables 4.7 and 4.8 show that the Japan COS and the Australian Curriculum: Mathematics cover a similar level of algebraic skill by the end of Year 9.

Case 2: Statistics and probability

Table 4.9: Chance – Year 7

Year 7 Australian Curriculum: Mathematics

Chance

Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)

- discussing the meaning of probability terminology (for example probability, sample space, favourable outcomes, trial, events and experiments)
- distinguishing between equally likely outcomes and outcomes that are not equally likely

Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)

- expressing probabilities as decimals, fractions and percentages

Year 7 Australian Curriculum: Mathematics	
Year 7 USA CCSS	Year 7 Japan COS
<p><u>Chance</u> Investigate chance processes and develop, use, and evaluate probability models</p> <ul style="list-style-type: none"> Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. More detail is given for this content: more on experimental probability, ways of organising results and interpreting results. 	<p><u>Chance</u> Is not studied at this level.</p>

Table 4.10: Chance – Year 8

Year 8 Australian Curriculum: Mathematics	
<p><u>Chance</u> Identify <u>complementary events</u> and use the <u>sum</u> of probabilities to solve problems (ACMSP204)</p> <ul style="list-style-type: none"> identifying the complement of familiar events understanding that probabilities range between 0 to 1 and that calculating the probability of an event allows the probability of its complement to be found <p>Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and'. (ACMSP205)</p> <ul style="list-style-type: none"> posing 'and', 'or' and 'not' probability questions about objects or people <p>Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292)</p> <ul style="list-style-type: none"> using Venn diagrams and two-way tables to calculate probabilities for events, satisfying 'and', 'or' and 'not' conditions understanding that representing data in Venn diagrams or two-way tables facilitates the calculation of probabilities collecting data to answer the questions using Venn diagrams or two-way tables 	
Year 8 USA CCSS	Year 8 Japan COS
<p><u>Chance</u> N/A</p>	<p><u>Chance</u> Students will understand probability by observing and experimenting with uncertain phenomena, and they will be able to use probability in analysis and representation.</p> <p>To understand the need for and the meaning of probability and to be able to determine probability in simple cases</p> <p>To grasp and explain uncertain phenomena</p>

Table 4.11: Chance – Year 9

Year 9 Australian Curriculum: Mathematics	
<p><i>Chance</i></p> <p>List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225)</p> <ul style="list-style-type: none"> conducting two-step chance experiments using systematic methods to list outcomes of experiments and to list outcomes favourable to an event comparing experiments which differ only by being undertaken with replacement or without replacement <p>Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)</p> <ul style="list-style-type: none"> using Venn diagrams or two-way tables to calculate relative frequencies of events involving 'and', 'or' questions using relative frequencies to find an estimate of probabilities of 'and', 'or' events <p>Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians (ACMSP227)</p> <ul style="list-style-type: none"> investigating a range of data and its sources, for example the age of residents in Australia, Cambodia and Tonga; the number of subjects studied at school in a year by 14-year-old students in Australia, Japan and Timor-Leste 	
Year 9 USA CCSS	The USA CCSS courses of study are not part of this review. Content for Year 9 is provided under the High School Standards, where the content is organised by course rather than by year of study.
Year 9 Japan COS	

Chance

Students will understand that they can infer the trends in a population by analysing the trends in the samples, perhaps utilising computers in the process.

To understand the need for and meaning of sampling

To infer and explain trends in a population by using simple sampling

Discussion: Chance

The comparison curricula for chance is shown in Tables 4.9, 4.10 and 4.11. The Australian Curriculum: Mathematics provides a greater emphasis on Statistics and Probability than either USA CCSS or Japanese COS. The study of probability in the Australian Curriculum: Mathematics provides a progression of increasingly challenging concepts and skills across the year levels. At every year level compared, the Australian Curriculum: Mathematics provides greater challenge than either Japan COS or USA CCSS. The study of chance and data is relevant in many careers as well as being important for making sense of the world. The concepts in chance take time to develop and opportunities are given for this to occur.

The Year 7 Australian Curriculum: Mathematics focuses on simple sample spaces and assigning probabilities, thus providing opportunity to connect with the study of fractions, decimals and percentages. It is important that a sound understanding of the connections between fractions,

decimals and percentages is developed prior to this study of probability. USA CCSS focuses on early concepts of the meaning of probability and experimental probability. This is also the focus of Year 8 Japan COS. Formal study of probability is not included in the Year 8 USA CCSS or Japan COS Year 9 course.

Making connections within and across the content strands of mathematics is an important factor in establishing deep understanding. The level of language required to understand the content in 'Chance' Years 7-10 could be quite challenging for some students. The elaborations and connections to the general capabilities provide some suggestions to develop the language needed, particularly at Year 7.

Case 3: Data representation and interpretation

Table 4.12: Data representation and interpretation – Year 7

Year 7 Australian Curriculum: Mathematics

Data representation and interpretation

Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)

- obtaining secondary data from newspapers, the Internet and the Australian Bureau of Statistics
- investigating secondary data relating to the distribution and use of non-renewable resources around the world

Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)

- understanding that some data representations are more appropriate than others for particular data sets, and answering questions about those data sets
- using ordered stem-and-leaf plots to record and display numerical data collected in a class investigation, such as constructing a class plot of height in centimetres on a shared stem-and-leaf plot for which the stems 12, 13, 14, 15, 16 and 17 have been produced

Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)

- understanding that summarising data by calculating measures of centre and spread can help make sense of the data

Describe and interpret data displays using median, mean and range (ACMSP172)

- using mean and median to compare data sets and explaining how outliers may affect the comparison
- locating mean, median and range on graphs and connecting them to real life

Year 7 USA CCSS	Year 7 Japan COS
<p>Draw informal comparative inferences about two populations</p> <ul style="list-style-type: none"> • Understand that statistics can be used to gain information about a population by examining a sample of the population; generalisations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. • Use data from a random sample to draw inferences about a population with an unknown 	<p>Students will gather data purposefully and organise the data in table and graphs, utilising tools such as computers; students will be able to interpret the trends by examining the representative values and measures of dispersion</p> <p>To understand the need for and the meaning of histograms and representative values</p> <p>To identify and explain trends by using representative values and histograms</p>

<p>characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p> <p>Use random sampling to draw inferences about a population</p> <ul style="list-style-type: none"> • Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. • Use measures of centre and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. 	
--	--

Table 4.13: Data representation and interpretation – Year 8

Year 8 Australian Curriculum: Mathematics	
<p><u>Data representation and interpretation</u></p> <p>Investigate techniques for collecting <u>data</u>, including census, sampling and observation (ACMSP284)</p> <ul style="list-style-type: none"> identifying situations where data can be collected by census and those where a sample is appropriate <p>Explore the practicalities and implications of obtaining <u>data</u> through sampling using a variety of investigative processes (ACMSP206)</p> <ul style="list-style-type: none"> investigating the uses of random sampling to collect data <p>Explore the variation of means and proportions of random samples drawn from the same <u>population</u> (ACMSP293)</p> <ul style="list-style-type: none"> using sample properties to predict characteristics of the population <p>Investigate the effect of individual <u>data</u> values, including outliers, on the <u>mean</u> and <u>median</u> (ACMSP207)</p> <ul style="list-style-type: none"> using displays of data to explore and investigate effects 	
Year 8 USA CCSS	Year 8 Japan COS
<p><u>Data representation and interpretation</u></p> <p>Investigate patterns of association in bivariate data</p> <ul style="list-style-type: none"> Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hour as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarising data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores? 	<p><u>Data representation and interpretation</u></p> <p>N/A</p>

Table 4.14: Data representation and interpretation – Year 9

Year 9 Australian Curriculum: Mathematics	
<p><u>Data representation and interpretation</u></p> <p>Identify everyday questions and issues involving at least one numerical and at least one <u>categorical variable</u>, and collect <u>data</u> directly and from secondary sources (ACMSP228)</p> <ul style="list-style-type: none"> comparing the annual rainfall in various parts of Australia, Pakistan, New Guinea and Malaysia <p>Construct back-to-back stem-and-leaf plots and histograms and describe <u>data</u>, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282)</p> <ul style="list-style-type: none"> using stem-and-leaf plots to compare two like sets of data such as the heights of girls and the heights of boys in a class describing the shape of the distribution of data using terms such as 'positive skew', 'negative skew' and 'symmetric' and 'bi-modal' <p>Compare <u>data displays</u> using <u>mean</u>, <u>median</u> and range to describe and interpret <u>numerical data</u> sets in terms of location (centre) and spread</p> <ul style="list-style-type: none"> comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plots 	
Year 9 USA CCSS	The USA CCSS courses of study are not part of this review. Content for Year 9 is provided under the High School Standards, where the content is organised by course rather than by year of study.
Year 9 Japan COS	
<p>Students will understand that they can infer the trends in a population by analysing the trends in the samples, perhaps utilising computers in the process.</p> <p>To understand the need for and meaning of sampling</p> <p>To infer and explain trends in a population by using simple sampling</p>	

Discussion: Data representation and interpretation

The Australian Curriculum: Mathematics study of data and data representation builds on the strong foundations established in the primary years. Comparison curricula for data representation and interpretation are shown in Tables 4.12, 4.13 and 4.14. In Year 7 there is a strong focus on gathering data, choosing appropriate representations of data and interpreting the data. At Year 8 concepts of variation and sampling are introduced. The Year 9 curriculum provides the opportunity to deepen understanding. Japan COS does not focus on the study of data to the same level as the Australian Curriculum: Mathematics. Explicit learning statements only appear at Years 7 and 8. US CCSS has many aspects in common with the Australian Curriculum: Mathematics although there are differences. In USA CCSS, variation and sampling feature strongly at Year 7. The Australian Curriculum: Mathematics includes these topics at Year 8. USA CCSS includes the study of bivariate data at Year 8. The study of bivariate data links to the Year 8 study of linear relations. Bivariate data is part of the Australian Curriculum: Mathematics Year 10 course of study. The study of linear relationships is part of the Year 10 curriculum and it is valid to make these connections at this stage. By introducing bivariate data at Year 8 it provides the opportunity to engage students in context and mathematically with linear relationships. Consideration needs to be given to the time available to introduce or include particular content at each level. Some challenging concepts are introduced in the sub-strand of chance at Year 8. It is important that enough time is left to focus on these

concepts. In this instance there is a strong argument to be made to leave bivariate data until Year 10.

The Australian Curriculum: Mathematics Data and Data Representation develops and extends the foundations of the primary years through to the secondary years to give a sound background for further study in senior secondary.

Comparison of senior years courses

The senior secondary Australian Curriculum Mathematics consists of four subjects in mathematics, with each subject organised into four units. The subjects are designed to meet the learning needs of a particular group of senior secondary students.

The Australian Curriculum: Mathematics Essential Mathematics Units 1-4 and Ontario Mathematics for Work and Everyday Life Grades 11 and 12

Essential Mathematics focuses on ‘using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings’. Ontario Mathematics for Work and Everyday Life is designed to help ‘students consolidate basic knowledge and skills of the workplace and in everyday life. The expectations support the use of hands-on projects and other experiences that make mathematics more meaningful for students.’ The core topics for each course are summarised in Table 4.15 below.

Table 4.15: Core Topics for Australian Curriculum: Mathematics Essential Mathematics Units 1-4

Essential Mathematics Unit 1	Essential Mathematics Unit 2	Essential Mathematics Unit 3	Essential Mathematics Unit 4
Calculations, percentages and rates; Measurement; Algebra; Graphs ;	Representing and comparing data; percentages; Rates and Ratios; Time and Motion	Measurement; Scales, plans and models; Graphs; Data collection	Probability and relative Frequencies; Earth Geometry and time zones; Loans and compound interest.
Mathematics for Work and Everyday Life Grade 11		Mathematics for Work and Everyday Life: Grade 12	
Earning and Purchasing; Savings investing and borrowing; transportation and travel		Reasoning with data, Personal Finance; Applications of measurement	

Case 4: Australian Curriculum: Mathematics Essential Mathematics and Ontario Mathematics for Work and Everyday Life, Reasoning with Data Grade 12

Table 4.16 below contains the content descriptions for one topic from Essential Mathematics Unit 2 and one comparison topic from Reasoning with Data Grade 12.

Table 4.16: Content Descriptions

Australian Curriculum: Mathematics Essential Mathematics (EM)
<p><u>Topic 1: Representing and comparing data</u></p> <p>Classifying data:</p> <ul style="list-style-type: none"> • identify examples of categorical data (ACMEM043) • identify examples of numerical data. (ACMEM044) <p>Data presentation and interpretation:</p> <ul style="list-style-type: none"> • display categorical data in tables and column graphs (ACMEM045) • display numerical data as frequency distributions, dot plots, stem and leaf plots, and histograms (ACMEM046) • recognise and identify outliers (ACMEM047) • compare the suitability of different methods of data presentation in real-world contexts. (ACMEM048) <p>Summarising and interpreting data:</p> <ul style="list-style-type: none"> • identify the <u>mode</u> (ACMEM049) • calculate measures of central tendency, the arithmetic <u>mean</u> and the <u>median</u> (ACMEM050) • investigate the suitability of measures of central tendency in various real-world contexts (ACMEM051) • investigate the effect of outliers on the <u>mean</u> and the <u>median</u> (ACMEM052) • calculate and interpret quartiles, deciles and percentiles (ACMEM053) • use informal ways of describing spread, such as spread out/dispersed, tightly packed, clusters, gaps, more/less dense regions, outliers (ACMEM054) • calculate and interpret statistical measures of spread, such as the <u>range</u>, <u>interquartile range</u> and standard deviation (ACMEM055) • investigate real-world examples from the media illustrating inappropriate uses, or misuses, of measures of central tendency and spread (ACMEM056) <p>Comparing data sets:</p> <ul style="list-style-type: none"> • compare back-to-back stem plots for different data-sets (ACMEM057) • complete a five number summary for different datasets (ACMEM058) • construct box plots using a five number summary (ACMEM059) • compare the characteristics of the shape of histograms using symmetry, skewness and bimodality (ACMEM060) <p style="text-align: right;">(cont)</p>

Ontario :Reasoning with Data, Grade 12

Interpreting and Displaying Data

By the end of this course, students will:

1. read and interpret graphs (e.g., bar graph, broken-line graph, histogram) obtained from various sources (e.g., newspapers, magazines, Statistics Canada website)
2. explain the distinction between the terms population and sample, describe the characteristics of a good sample, and explain why sampling is necessary (e.g., time, cost, or physical constraints)
3. Sample problem: What are some factors that a manufacturer should consider when determining whether to test a sample or the entire population to ensure the quality of a product?
4. collect categorical data from primary sources, through experimentation involving observation (e.g., by tracking food orders in restaurants offering healthy food options) or measurement, or from secondary sources (e.g., Internet databases, newspapers, magazines), and organise and store the data using a variety of tools (e.g., spreadsheets, dynamic statistical software)
5. Sample problem: Observe cars that pass through a nearby intersection. Collect data on seatbelt usage or the number of passengers per car.
6. represent categorical data by constructing graphs (e.g., bar graph, broken-line graph, circle graph) using a variety of tools (e.g., dynamic statistical software, graphing calculator, spreadsheet)
7. make inferences based on the graphical representation of data (e.g., an inference about a sample from the graphical representation of a population), and justify conclusions orally or in writing using convincing arguments (e.g., by showing that it is reasonable to assume that a sample is representative of a population)
8. make and justify conclusions about a topic of personal interest by collecting, organising (e.g., using spreadsheets), representing (e.g., using graphs), and making inferences from categorical data from primary sources (i.e., collected through measurement or observation) or secondary sources (e.g., electronic data from databases such as E-STAT, data from newspapers or magazines)
9. explain how the media, the advertising industry, and others (e.g., marketers, pollsters) use and misuse statistics (e.g., as represented in graphs) to promote a certain point of view (e.g., by making general statements based on small samples; by making statements using general population statistics without reference to data specific to minority groups)
10. Sample problem: The headline that accompanies the following graph says 'Big Increase in Profits'. Suggest reasons why this headline may or may not be true.
11. Gather, interpret, and describe information about applications of data management in the workplace and in everyday life

Similarities: Each course outlines what students are expected to do and understand. Students are expected to interpret information, make decisions and communicate their understandings. Each course focuses on content essential to productively living and working in society. The mathematical understanding and skills to be developed are of a similar standard and appear to cover very similar content over the duration of both courses. Both courses incorporate the use of technology in solving problems. The mathematical proficiencies described in the Australian Curriculum: Mathematics Years 7-10 documents are expected to be applied in all senior secondary courses. The comparable Mathematical Processes described in the Ontario curriculum are expected to be applied throughout.

Differences: The curriculum documents are written in quite different styles. Essential mathematics describes the mathematical content to be learned and gives advice to teachers on applying the content in context. It is acknowledged that context is important and that some contexts may not be relevant for all students. Teachers are advised to find relevant and suitable contexts. Mathematics for Work and Everyday Life modules are set in a context. Student actions such as gather, interpret,

describe, solve are specifically described. The mathematical content is limited in specification. It is stated that students will consolidate mathematical skills.

The intended content of Essential Mathematics and Mathematics for Work and Everyday Life Grade 11 and Grade 12 as summarised in Table 4.15 is very similar, with the exception that bivariate data is not included in the Ontario Course. Units 1, 2 and 3 Essential Mathematics each includes aspects of data representation and interpretation. Ontario includes this material at Grade 12 only (refer to Table 4.16). The data and data representation content for each unit in the Australian Curriculum: Mathematics builds on previous units. This contrasts with the Ontario Course where financial mathematics features at both year levels.

The curriculum of Ontario was included in this review because of the intent to cater for every student and recent improved performance. Australian Curriculum: Mathematics Essential Mathematics and Ontario Mathematics for Work and Everyday Life, Reasoning with Data Grade 12 describe content that caters for students not intending to study mathematics at University level.

Case 5: Australian Curriculum: Mathematics General Mathematics, Ontario Foundations for College Mathematics and Finland Basic Mathematics

Australian Curriculum: Mathematics General Mathematics is designed for those students who want to extend their mathematical skills beyond Year 10 level but whose future studies or employment pathways do not require knowledge of calculus. The subject is designed for students who have a wide range of educational and employment aspirations, including continuing their studies at university or TAFE. Ontario Foundations for College Mathematics and Finland Basic Mathematics cater for students intending to follow similar pathways to Australian Curriculum: Mathematics General Mathematics students. Table 4.17 illustrates the different organisation of the courses in the comparison curricula.

Table 4.17: Subject organisation - Australian Curriculum: Mathematics General Mathematics, Ontario Foundations for College Mathematics and Finland Basic Mathematics

Australian Curriculum: Mathematics GM Unit 1	Australian Curriculum: Mathematics GM Unit 2	Australian Curriculum: Mathematics GM Unit 3	Australian Curriculum: Mathematics GM Unit 4
Consumer Arithmetic; Algebra and Matrices; Shape and Measurement.	Univariate data analysis and the statistical investigation process; Applications of Trigonometry; Linear equations and their graphs.	Bivariate data analysis; Growth and decay in sequences, Graphs and networks	Time series analysis; Loans, investments and annuities; Networks and decision mathematics
Ontario Foundations for College Mathematics Grade 11		Ontario Foundations for College Mathematics Grade 12	
Mathematical models; personal finance; geometry and trigonometry; data management		Mathematical models; personal finance; geometry and trigonometry; data management	
Finland: Basic Mathematics Compulsory courses			Finland: Basic Mathematics: Specialisation Courses
Expressions and equations; Geometry; Mathematical Models 1; Mathematical analysis; Statistics and probability; Mathematical Models 11;			Commercial mathematics; Mathematical models 111

Similarities: Each course is designed to broaden understanding of real-world applications of mathematics and prepare students for employment or further study. The courses do not include material to prepare students for future study where knowledge of calculus is required. All courses of study provide exposure to algebraic, geometric and statistical thinking.

Differences: Australian Curriculum: Mathematics General Mathematics is more explicit in describing the mathematical content. Foundations for College Mathematics include more depth in the treatment of quadratic equations, as does Basic Mathematics. Basic Mathematics also includes functions and understanding the derivative as a measure of the rate of change. Australian Curriculum: Mathematics General Mathematics includes Matrices and Matrix arithmetic in Unit 1. Some knowledge of matrices is needed for units 3 and 4 ‘networks’. Networks are not covered in Foundations for College Mathematics or Basic Mathematics in Finland.

Australian Curriculum: Mathematics Mathematical Methods, Specialist Mathematics

Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics cater for students intending to study mathematics at university level. Mathematical Methods focusses on calculus and statistics. Specialist Mathematics provides additional opportunities to develop rigorous mathematical arguments and proofs, and to use mathematical and statistical models more extensively. Finland Advanced Mathematics and Ontario University preparation courses cater for students intending to pursue similar pathways.

Case 6: Senior secondary Mathematical Methods, Specialist Mathematics, Finland Advanced Mathematics and Ontario study of Functions

Table 4.18: Subject organisations of Senior Years Mathematical Methods, Specialist Mathematics, Finland Advanced Mathematics and Ontario study of Functions

Australian Curriculum: Mathematics SM Unit 1	Australian Curriculum: Mathematics SM Unit 2	Australian Curriculum: Mathematics SM Unit 3	Australian Curriculum: Mathematics SM Unit 4	
Combinatorics, Vectors in the plane , Geometry	Trigonometry, Matrices, Real and complex numbers	Complex numbers, Functions and sketching graphs, Vectors in three dimensions	Integration and applications of integration, Rates of change and differential equations, Statistical inference	
Australian Curriculum: Mathematics MM Unit 1	Australian Curriculum: Mathematics MM Unit 2	Australian Curriculum: Mathematics MM Unit 3	Australian Curriculum: Mathematics MM Unit 4	
Functions and graphs, Trigonometric functions, Counting and probability	Exponential functions, Arithmetic and geometric sequences and series, Introduction to differential calculus	Further differentiation and applications, Integrals, Discrete random variables	4 The logarithmic function, Continuous random variables and the normal distribution, Interval estimates for proportions	
Ontario Grade 11		Ontario Grade 12		
Functions, University Preparation (MCR3U),	Applications, University/College Preparation (MCF3M)	Advanced Functions, University Preparation (MHF4U),	Calculus and Vectors, University Preparation (MCV4U),	Mathematics of Data Management, University Preparation (MDM4U)
Finland Advanced Courses COMPULSORY COURSES			Finland Courses Advanced SPECIALISATION COURSES	
Functions and equations (MAA1), Polynomial functions (MAA2), Geometry (MAA3), Analytical geometry (MAA4), Vectors (MAA5) Probability and statistics (MAA6), The derivative (MAA7), Radical and logarithmic functions (MAA8), Trigonometric functions and number sequences (MAA9), Integral calculus (MAA10)			Number theory and logic (MAA11), Numerical and algebraic methods (MAA12), Advanced differential and integral calculus (MAA13)	

Australian Curriculum: Mathematics senior secondary Mathematical Methods, Specialist Mathematics and Ontario University preparation courses are organised by year level. Finland Advanced courses summarised in Table 4.18 are organised by course content rather than by year level. Taken as a whole the individual courses provide a very similar level of mathematics to that of senior secondary Mathematical Methods and Specialist Mathematics.

Table 4.19: Senior secondary Mathematical Methods, Finland Advanced Mathematics and Ontario study of Functions

Australian Curriculum: Mathematics Mathematical Methods (MM)

Unit 1

Topic 1: Functions and graphs

Includes: Lines and linear relationships, Review of quadratic relationships, Inverse proportion, Powers and polynomials, Graphs of relations

Functions

- understand the concept of a function as a mapping between sets, and as a rule or a formula that defines one variable quantity in terms of another (ACMMM022)
- use function notation, domain and range, independent and dependent variables (ACMMM023)
- understand the concept of the graph of a function (ACMMM024)
- examine translations and the graphs of $y=f(x)+a$ and $y=f(x+b)$ (ACMMM025)
- examine dilations and the graphs of $y=cf(x)$ and $y=f(kx)$ (ACMMM026)
- recognise the distinction between functions and relations, and the vertical line test. (ACMMM027)

Topic 2: Trigonometric functions

Includes: Cosines and sine rules, Circular measure and radian measure, Trigonometric functions

Unit 2

Topic 1: Exponential functions

Includes: Indices and the index laws:

Exponential functions:

- establish and use the algebraic properties of exponential functions (ACMMM064)
- recognise the qualitative features of the graph of $y=ax$ ($a>0$) including asymptotes, and of its translations ($y=ax+b$ and $y=ax+c$) (ACMMM065)
- identify contexts suitable for modelling by exponential functions and use them to solve practical problems (ACMMM066)
- solve equations involving exponential functions using technology, and algebraically in simple cases. (ACMMM067)

Unit 4

Topic 1: The logarithmic function

Logarithmic functions:

- define logarithms as indices: $a^x=b$ is equivalent to $x=\log_a b$ i.e. $a^{\log_a b}=b$ (ACMMM151)
- establish and use the algebraic properties of logarithms (ACMMM152)
- recognise the inverse relationship between logarithms and exponentials: $y=ax$ is equivalent to $x=\log_a y$ (ACMMM153)
- interpret and use logarithmic scales such as decibels in acoustics, the Richter Scale for earthquake magnitude, octaves in music, pH in chemistry (ACMMM154)
- solve equations involving indices using logarithms (ACMMM155)
- recognise the qualitative features of the graph of $y=\log_a x$ ($a>1$) including asymptotes, and of its translations $y=\log_a x+b$ and $y=\log_a(x+c)$ (ACMMM156)

Australian Curriculum: Mathematics Mathematical Methods (MM)

- solve simple equations involving logarithmic functions algebraically and graphically (ACMMM157)
- identify contexts suitable for modelling by logarithmic functions and use them to solve practical problems. (ACMMM158)

Finland	Ontario
<p><u>Functions and equations (MAA1)</u> The objectives of the course are for students to:</p> <ul style="list-style-type: none"> • Reinforce their skills in solving equations and calculating percentages • Consolidate their understanding of the concepts of power, square root and proportionality • Become accustomed to using rules for calculating powers and square roots • Consolidate their understanding of the concept of the function by examining power and exponential functions • Learn to solve power equations <p>Core Contents:</p> <ul style="list-style-type: none"> • Power functions • Solving power equations • Roots and fractional powers • Exponential functions <p><u>Radical and logarithmic functions (MAA8)</u> The objectives of the course are for students to:</p> <ul style="list-style-type: none"> • be familiar with the properties of radical, exponential and logarithmic functions and know how to solve equations related to these • examine radical, exponential and logarithmic functions by means of the derivative • learn to differentiate composite functions • examine the inverse functions of strictly monotone functions <p>Core Contents:</p> <ul style="list-style-type: none"> • radical functions and equations • exponential functions and equations • logarithmic functions and equations • derivatives of composite functions • inverse functions • derivatives of radical, exponential and logarithmic functions <p>Additional functions studied</p> <ul style="list-style-type: none"> • Polynomial functions (MAA2) • Trigonometric functions and number sequences (MAA9) 	<p>Unit 1 - Functions, Grade 11 <u>Characteristics of Functions:</u></p> <ol style="list-style-type: none"> 1. demonstrate an understanding of functions, their representations, and their inverses, and make connections between the algebraic and graphical representations of functions using transformations; 2. determine the zeros and the maximum or minimum of a quadratic function, and solve problems involving quadratic functions, including problems arising from real-world applications; 3. demonstrate an understanding of equivalence as it relates to simplifying polynomial, radical, and rational expressions. <p>List of Functions studied in Functions Grade 11:</p> <ol style="list-style-type: none"> 1. Solving Problems Involving Quadratic Functions 2. Exponential Functions 3. Discrete Functions 4. Trigonometric Functions <p>Unit 3 – Advanced Functions, Grade 12 List of Functions studied in Functions Grade 12</p> <ol style="list-style-type: none"> 5. Exponential and Logarithmic Functions: 6. Trigonometric Functions: 7. Polynomial and Rational Functions:

Similarities: The content in Table 4.19 shows the organisation of the study of functions in the comparison curricula. Across the senior years, each course develops the understanding of the concept and features of a function, related graphs and the distinction between a function and a relation. The types of functions studied are comparable although the order of study is different.

In addition to the content shown in Table 4.19, senior secondary Mathematics, Specialist Mathematics covers advanced differential and integral calculus at a level comparable with Finland's advanced specialisation courses.

Differences: Australian Curriculum Mathematics Mathematical Methods is an integrated study with a focus on functions, differential calculus and probability. Ontario Grades 11 and 12 and Finland Upper Secondary Mathematics are organised into courses that focus on a specific topic. These courses, taken as a whole, roughly compare to Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics combined.

Integral calculus is included in Finland Upper Secondary Mathematics, Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics. This topic is not included in the Ontario courses.

Australian Curriculum: Mathematics Mathematical Methods and Specialist Mathematics compare favourably with the highest level of mathematics offered in Finland Upper Secondary courses. Ontario Grade 12 courses do not cover some of the more advanced topics.

5. Science (Foundation to Year 6 and Senior Secondary Physics) – Professor Igor Bray

Executive Summary

The Foundation to Year 6 curriculum is considerably overcrowded due to the inappropriate imposition of high-level disciplines to the lower years. Instead, the formative years should be dominated by core literacy, numeracy, social and physical development. The latter years are the appropriate time for engaging in greater breadth of learning and increasing the depth of learning undertaken in previous years. Though explicit time allocation to science teaching has not been given it would have been helpful to do so. We suggest starting with a one hour per week allocation starting in Year 3, and increasing by one hour annually to four hours per week in Year 6. Given that Science is an ideal context for supporting the core skills of literacy, numeracy and social development, we are hopeful that such a substantial explicit commitment to Science will not be problematic.

The senior secondary Physics curriculum is mostly in good shape in terms of content, though some notation consistency requires attention, as does suitability of Unit 4 content. However, the subdivision of Physics by the three strands of ‘Science Understanding, Science Inquiry Skills, and Science as a Human Endeavour’ is unhelpful, as is the notion that there are ‘five levels of student achievement’ associated with the A-E grades. Fortunately, these inappropriate ideas may be readily ignored, with the teachers being encouraged to use the given content with traditional marks-based assessments that can be subsequently subdivided into grades. Uniformity of assessment is best achieved by having State/Territory-wide exams beginning at the end of Year 11.

Preliminaries

I have been asked to review a subset of the Australian Curriculum: Science concentrating on Foundation to Year 6 and senior secondary Physics. Whereas my professional expertise is strongly aligned with Senior Physics, I am also able to comment on the curriculum for the more formative years due to my continuous engagement with primary schools via the Scientists-in-Schools program during the progression of my own children through the sector.

In undertaking this review it was important to familiarise myself with how other well-performing countries present their curricula. I have specifically chosen Singapore and Finland for two reasons: their renowned outstanding performance in international educational benchmarks, and because their documents have also undertaken recent reviews and updates, for example, refer to <http://www.moe.gov.sg/education/syllabuses/sciences/> and http://www.oph.fi/english/curricula_and_qualifications/basic_education.

What struck me immediately is the substantial variation in the way the information is presented. There is a general agreement on the years for primary and secondary education, but the variation within the two sectors was surprising to my eyes. This makes for the benchmarking exercise across different countries more difficult, but also perhaps more important because large variation can lead to development of new curricula in isolation to what has already been done elsewhere. We will

invoke comparison with Singapore and Finland when detailed content of the Australian Curriculum is discussed, and also give an overview of the benchmarking process at the end.

We now turn to specific sections of the Foundation to Year 10 Science document, restricting ourselves to Foundation to Year 6 only, beginning with the Rationale section.

Analysis of specific section of the Australian Curriculum: Science (Foundation to Year 6 only)

Rationale

The first three paragraphs are outstanding and capture the essence of science and its cultural value. The emphasis in the third paragraph on natural inquisitiveness and the joy of discovery is admirable. The pursuit of science is not only of practical value, but also for personal growth and well-being. I would add that all children are born scientists, and it is our task to nurture this by ensuring that learning is always enjoyed, and never a chore.

The fourth paragraph argues that science can be usefully subdivided into six categories of ‘patterns, order and organisation; form and function; stability and change; systems; scale and measurement; and matter and energy’. Such subdivisions are problematic and rarely useful. Even the subdivision of science by the historical disciplines causes problems, with much progress being due to activity across the boundaries, often referred to as multi-disciplinary science. Subdivision is necessary for managing the detail of the latter years of scientific study. In the more formative years it is not as helpful.

Aims

The first five dot points, and the last, are admirably stated as valuable outcomes from the engagement in the pursuit of science. The sixth dot point can be a substantial discipline in itself as it is about the history of science. This is an important motivating activity, but it needs to be kept in perspective that the primary purpose of science lessons is to engage in the science, rather than its history. While science is a great context for improving numeracy, literacy and the knowledge of history, these are not the primary aims of science lessons.

Organisation

The very first sentence states: ‘The Australian Curriculum: Science has three interrelated strands: Science Understanding, Science as a Human Endeavour and Science Inquiry Skills’. We are introduced to yet another subdivision that has little value. Scientific understanding begins with inquiry and is carried out by humans. Why subdivide scientific learning in such a way? In general subdivisions are useful if the component parts have little overlap, and are of roughly the same size. Here we have overlapping parts of very different sizes, and hence not helpful. Using Google on ‘Science as a Human Endeavour’ I found only Australian websites. Has the rest of the world missed this important subdivision? In creating such subdivisions, imposed over all Foundation to Year 12 years, it seems to me that the writers have not appreciated the complex relationship between scientifically acquired knowledge and the skill set used to do so. In science, while knowledge may be the ultimate goal, the journey to obtain it is more important than the destination. This is because scientific skill sets tend to be generic, and able to be reused to acquire new knowledge. Inquiry Skills and Understanding should not be separated. They feed on each other in an iterative way. Examples

of human scientific endeavour are useful to motivate students by potentially following someone else's example, but their discussion is not a scientific activity in itself. A separate category for the latter can readily lead an inexperienced teacher to spend too much time on this non-scientific activity. The statement: 'the three strands of the Australian Curriculum: Science should be taught in an integrated way' seems to recognise the problem with the subdivision. There is no need for it.

The Science Understanding strand is separated into Biological Sciences, Chemical Sciences, Earth and Space Sciences, and Physical Sciences. This is done across all Foundation to Year 12 years! While this has merit for the latter years it has none for the more formative years, where it creates a needlessly overcrowded curriculum. The subdivision of the early years, starting with five-year olds, into four learning areas (English, history, mathematics and science), and then further subdividing these into their constituent parts is a fundamental flaw of the Australian Curriculum. Instead, in the earlier years activities should concentrate predominantly on literacy, numeracy and social (including physical) development, as is the case in Finland and Singapore. As the years advance, the learning activities should broaden to include the greater variety of human activity, while also providing greater depth to the core learning of literacy, numeracy and social development. Rather than the square vertical (with increasing years) model used by the writers for the Foundation to Year 12 curriculum, a more appropriate model is a triangle with the apex representing the core literacy, numeracy and social development for the early years, with broader activities being introduced in the latter years. Additionally, during the course of the latter years greater depth should be given to all previously undertaken learning.

The Overarching Ideas

These are the six categories listed under the Rationale subsection. There is no harm done in the statements provided under the specified categories. They may be helpful, particularly to the inexperienced teacher, but they are not used much in the substantive part of the document.

Science across Foundation to Year 12

This section gives a very useful overview of what is intended across the F-12 years. The reality is that different students learn at different rates, and compromises and accommodation for different abilities will always have to be made.

Gifted and talented students

Personally, I have a very strong dislike for labelling children in any way, and particularly this way. Instead, extension activities would be ideally available for those children who have finished ahead of others. There is no need to label them in any way. Such activities should be much more horizontal rather than vertical. Accelerated vertical activities are problematic because they will lead to boredom in future years. It is a major challenge to provide suitable horizontal extension activities, and this requires particularly experienced teachers to do so.

General capabilities

Science is an ideal context for establishing the seven listed general capabilities. It just needs to be remembered that during science lessons the primary activity is the teaching and learning of the science, and that the very important general capabilities are acquired more by osmosis and

reinforcement rather than direct instruction. Coordination of science teaching with mathematics and literacy lessons would be ideal, but generally hard to achieve in practice.

Cross-curriculum priorities

Science knows nothing about the nationality or ethnicity of its participants, and this is its great unifying strength. Any culture that still exists today does so because of the various scientific and technological problems solved by their ancestors. To label scientific activity by the ethnicity of those involved is counter to the culture of science. On the contrary, examples should be sourced from a range of cultures, and most importantly gender. The latter is a particularly problematic aspect of science activity as it has been historically male dominated. Nevertheless, examples abound of outstanding male and female scientists of diverse ethnic origins, and that ought to be celebrated. Where relevant local Indigenous examples of science can be readily sourced such as the usage of skin-groups to maintain genetic diversity, or the usage of stars for navigation, care must be taken to ensure that the science comes first, and not the participants.

Implications for teaching, assessment and reporting

One of the areas where we as a society fail is in the misunderstanding of the true purpose of assessment and reporting. All too often this is used to create hierarchies of one child at the top through to another at the bottom. This has nothing to do with education, and is simply a reflection of our competitive spirit. Competition can be very healthy when it drives collective behaviour to improve, but it can also be very destructive if remedial action is not taken to help those who are lagging behind. The best purpose of assessment is to investigate the effectiveness of the teaching for the individual student involved, i.e. the teacher-student engagement. Excellent performance means both can move on, weaker performance means both need to take action. One strength of science is that the evaluation of the learning is much more objective than in most other learning areas, and is generally not a problem for teachers. However, the suggestion that Science as a Human Endeavour should be somehow assessed makes no sense. I am aware that there is much controversy around National Assessment Program – Literacy and Numeracy (NAPLAN). To my mind, knowing the performance of a child relative to the national cohort is somewhat useful, but primarily NAPLAN should be used to inform the government of the day where extra effective intervention is required. In other words NAPLAN should ‘reward’ poorer performance. Any stress in children is needlessly put there by adults who should know better. The usage of NAPLAN for entry into subsequent education institutions shows that it is a very effective predictor of future academic performance.

We now turn to the detailed descriptions of the Foundation to Year 10 content descriptions.

Foundation to Year 6 content descriptions

Foundation Year

As explained above, the square vertical model of high-level disciplines propagating down to five year old children is fundamentally flawed. For such children, literacy, numeracy and social and physical development should be the core activities. It is not unreasonable to expect that a helpful curriculum would clearly reflect the timing priorities of the core activities. The subdivision of science by the four disciplines, and across the early years, is well-intentioned, but misplaced.

At this point it is helpful to compare with Singapore and Finland. In Singapore, the Science Primary Syllabus starts in the third year of primary school, see <http://www.moe.gov.sg/education/syllabuses/sciences/files/science-primary-2014.pdf> and is separated into two two-year blocks: 3-4 and 5-6. Apart from the usual subdivisions of science, a particular emphasis is given to ‘white space’, a deliberately set aside free time to give teachers more freedom. Given the traditional perception of the Singaporean, and other Asian curricula, as being overly prescriptive and crowded, this presentation has a great deal to offer. Finland, also leaves the traditional science disciplines to later years, see http://www.oph.fi/download/47672_core_curricula_basic_education_3.pdf. Here, in the one document, the study of Languages is combined with Mathematics and the Sciences. Unlike the Australian Curriculum, but similarly to Singapore, Biology, Geography, Physics and Chemistry are first introduced in Year 5. They reserve the earlier years to observational activities within the local environment, and developing a healthy and respectful relationship with each other and nature.

So how should science be introduced to children of early primary school age, or should it feature at all? Fortunately, children are born scientists, and need little direct instruction in the early years. Inquisitiveness, observation and exploration should always be warmly encouraged and supported. Often questions may be beyond the teacher’s ability to answer. This should be celebrated, with ‘I don’t know’ being a perfectly good response. In some cases this could be followed up with ‘What do you think?’, or ‘Let’s see if we can work it out’. What is particularly helpful is to have physical models such as a big globe of the Earth, and a model of the solar system available for children to explore. These support the development of analytical questioning. For example, we can ask ‘is the sun a sphere or a disc?’ The raw observation suggests that it looks like a disc, but we can follow up with ‘what does a ball look like from a distance?’ The ability to develop spatial awareness is greatly supported by physical models. With greater intellectual development, children should be encouraged to see how changing perspectives, or frames of reference, can answer whether the earth goes around the sun, or vice versa, or what physical attributes are responsible for the phenomena of night and day, or for the seasons. Furthermore, a good globe will encourage the investigation of geography, and our physical, as well as social, place in the world.

Turning to the detail of the elaborations it is immediately clear that the specific categorisations on the left hand side have created pigeonholes on the right hand side that needed to be filled leading to some confused repetition. For example, we have ‘sharing observations with others and communicating their experiences’ under ‘Science as a Human Endeavour’ and then we have ‘taking part in informal and guided discussions relating to students’ observations’ under ‘Science Inquiry Skills’. Ignoring the needless repetition, the elaborations are self-evident, and appropriately concentrate on observation using all senses.

Years 1 and 2

The comments above for the Foundation Year apply equally to Years 1 and 2. These years are overly prescriptive of the science content at a period of a child’s development that is dominated by literacy, numeracy, and social and physical development. This comment is consistent with the Singapore and Finland primary science curricula. Nevertheless, it would be a missed opportunity not to use these

years to fine-tune the observational skills, together with an analytical questioning of the observations, such as seeing a pencil ‘bend’ as it enters the surface of water.

Years 3-6

Whereas for Foundation to Year 2, I would not be supportive of creating a mandatory time allocation for the study of science, this needs to happen at some stage, and on balance Year 3 seems appropriate for most children. Hopefully, by this age the children have age-appropriate literacy and numeracy skills, and these can be further supported and extended by engaging in scientific activity. Giving some brief written instructions to perform an experiment can enhance literacy skills. Numeracy development can be supported through activities that require measurement. Social development is supported by investigations as group activities. The latter requires careful management to ensure that all involved achieve positive outcomes. Many of the elaborations and achievement standards listed for Foundation to Year 2 can start to be implemented with an explicit time allocation in Year 3. Tentatively, one hour per week starting in Year 3, and increasing one hour per week in subsequent years until four hours per week in Year 6 seems approximately right. Since science supports numeracy and literacy, as well as social development, finding extra time for such activities would not be to the detriment of the core skills that all students should possess. It seems clear that the amount of content studied is completely dependent on the amount of time allocated. The fact this most basic aspect is missing from the documentation is most unfortunate.

The traditional discipline subdivisions of Biological, Chemical, Earth and Space, and Physical Sciences now start to become more useful. In applying the various elaborations, it would be helpful to keep in mind the underlying cognitive development model of an initial introduction which has little breadth or depth, but which grows in subsequent years. In this context it would be better to take a specific discipline in say Year 3 and show how it grows in breadth and depth in subsequent years. In other words the structure of the discipline is more important than the year of implementation. Given the variability in childhood cognitive development, flexibility of learning across the years is of considerable importance. This is the approach taken in Finland, with an inherent subsequent structure within the discipline aiding with categorisation. No attempt at discipline independent subdivision such as Science Understanding, Science as a Human Endeavour and Science Inquiry Skills is utilised.

Interestingly, Singapore does have similar overarching categories that are labelled: ‘Knowledge, Understanding and Applications’, ‘Skills and Processes’ and ‘Ethics and Attitudes’. These are also applied across all discipline areas and Primary 3-6 of the six years of compulsory education. However, they are populated rather differently. When such a subdivision is unhelpful, the entire corresponding pigeonhole contains either minimal entry, or is simply left blank. This way the Singapore version is much less overcrowded than the Australian one. I remain of the opinion that such an artificial and rather grandiose subdivision is not (helpful) necessary. It is not used in Singapore for Senior Science or Finland in any year. It would be better to ensure that these concepts are addressed within each academic discipline utilising its own unique culture.

Summary of the review of F-6 Science with explicit reference to the Scoping Brief

A) Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. the content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- *robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*
- *balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)*
- *scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.*

The early childhood science curriculum is unrealistic, overcrowded and arguably unnecessary. This comes from the subdivision of Science into the four academic disciplines of Biological, Chemical, Earth, and Physical Sciences, even down to the Foundation year attended by five year old children. Not only is this inappropriate for such young children, but it is also inappropriate to expect early primary teachers to be across such disciplines. Instead the early years should be devoted to the core skills of literacy, numeracy and social and physical development. We suggest a revision of the Foundation to Year 6 Science curriculum to begin with an explicit time allocation to Science of around one hour in Year 3, and increasing by one hour per week per year until Year 6. Once the amount of time available to teach Science is agreed upon, only then can a realistic curriculum be developed.

2. the soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to curriculum content in this learning area.

It is very important to clearly list achievement standards in the early years. Care needs to be taken to appreciate that students have different starting points and may progress at different rates. The early primary years should be dominated by achievement standards around the core skills of literacy, numeracy and social development, rather than Science. Once again, only when an explicit time allocation for Science can be agreed upon, can realistic achievement standards be defined across the years.

3. the appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across this learning area, and whether there are alternative approaches which could have been developed to introduce these themes.

Sustainability has Science as a natural context, and so this aspect is readily achieved and is particularly appropriate to the primary school years. Awareness of scientific approach to problem solving by Indigenous communities also has greatest potential in the primary school years. The explicit examples provided are of considerable assistance to teachers. The emphasis on Asia is a little

more problematic simply because of its vastness. It would be better to emphasise that Science spans all cultural, ethnic and geographical boundaries. It is one of the most unifying activities undertaken by mankind.

4. the extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.

This will be affected should a reorganisation of the Foundation to Year 6 Science curriculum be undertaken. Generally, there is considerable flexibility in the way science can be taught, which can be determined by the expertise of the teacher once they know how much time they have.

5. any significant treatment in the Australian Curriculum documents for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.

Assessment in Science is one of the more objective processes compared to other disciplines. This is as true in primary schools as it is in secondary schools. In this regard it is similar to numeracy. In the primary years, basic statements of achievement standards suffice. There is little need for explicit assessment in the early years, but eventually this changes with the more advanced years. The lack of a clear cognitive development that increases both depth and breadth of learning with increasing years is rather unfortunate.

6. whether the curriculum documentation in this learning area is friendly for students, teachers, and parents, and for development of accountability and reporting measures which will lead to effective school community engagement.

We have already discussed at length the organisational flaws, which make the Foundation to Year 6 Science curriculum unfriendly to all concerned. Effective community engagement with Science is much easier to maintain at primary schools than it is at secondary schools. This will remain the case irrespective of the curriculum.

7. whether the curriculum for this learning area encourages a love of learning, a joy of discovery, and a quest for knowledge and related skills.

The key factor here is the teacher, not the curriculum. The admirable qualities listed here would be overwhelmed by an overcrowded curriculum. The early years need considerable freedom for both student and teacher, and should not be overly prescribed.

B) Using four or five key content areas, skills, and/or topics considered essential in terms of the subject being evaluated, Subject matter specialists will also assess how the Australian Curriculum for this learning area compares with the curriculum of two other relevant countries, focussing on their approach to the inclusion and design of key learning content, core knowledge and accompanying rationale

The two international curricula chosen for this purpose are from Singapore and Finland, see <http://www.moe.gov.sg/education/syllabuses/sciences/files/science-primary-2014.pdf> http://www.opf.fi/download/47672_core_curricula_basic_education_3.pdf, respectively. The Singapore document is appropriately brief, and devotes more pages to the how and why rather than

what. In relation to the Singapore curriculum, the two primary two-year groups of Primary 3-4 and Primary 5-6 subdivide the Science syllabus content. The scientific content is not broken down by high-level academic disciplines, but rather by broad multidisciplinary concepts: Diversity, Cycles, Systems, Interactions and Energy. A specific time allocation is labelled as 'white space' to ensure that the teachers and students have plenty of freedom to pursue their own interests. The above concepts are elaborated and expanded to apply to living or non-living things, and some explicitly to people as opposed to other living things. The overall feel of the document is that considerable care has been taken to ensure appropriate time allocation will be available for the proposed activities.

There is considerable effort devoted to the discussion of teaching and learning through inquiry¹. This is appropriately focused on the primary school years, and the balance between student- and teacher-directed activities is suitably elaborated.

Assessment issues are discussed rather broadly with the focus on effective feedback to the student. It is not clear how the assessment is reported to the parents/guardians, but the brevity of the discussion suggests that this is not seen as a major issue.

The key features that we find attractive are the fact that Science activities begin to be formalised in the last four years of primary school, and that these activities are of a more traditional primary school nature. The emphasis on inquiry-based learning is admirable as is the deliberate reservation of time for 'white space' activities where students and teachers are free to pursue their own thing.

The Finnish document looks somewhat different to the Singapore one, but both can be readily seen to have substantial overlap depending on how the teacher implements them. The formal academic disciplines such as Biology, Geography, Physics and Chemistry begin seriously in Grade 7. Introduction to these disciplines begin in Grade 5. The early primary years have a science-like component that is labelled Environmental and Natural Studies. This includes Health, Safety, Social development, and mostly observational activities. Just over two pages are devoted to the first four years, with a substantial list given of what counts as good performance at the end of Grade 4 so that more academic discipline-related teaching can begin in Grade 5.

As with Singapore, the early primary years are reserved for literacy, numeracy and social development. The development of Science in the latter primary years is particularly attractive because it is based on traditional well-understood disciplines, without any overarching themes, but with appropriate subdivision of relevance to the discipline. The content is given in dot point form. It is sufficiently detailed, but not overly prescriptive. Expectations of what should be achieved at the end of each year are clear, reasonable and succinct.

¹ Science Syllabus Primary 2014, Ministry of Education, Singapore. Refer to:
<http://www.moe.gov.sg/education/syllabuses/sciences/files/science-primary-2014.pdf>

Senior secondary Physics

Organisation

This is a clearly written section that even states the number of hours allocated to each unit. The responsibility for the implementation is delegated to the state and territory education authorities, and so some variation in the implementation across Australia is to be expected. This is not necessarily a bad thing. A review of the implementation after a few years may wish to examine whether the level of uniformity is problematic or not.

Structure of Physics

Physics is admirably subdivided into the four units, one and two for Year 11, and three and four for Year 12. Adding how the shortcomings of existing theories led to the development of the special theory of relativity and the Standard Model of particle physics to Unit 4 is a revolution in itself for Australian secondary school Physics. I have a certain degree of apprehension regarding this introduction, and particularly for the Standard Model. Given that depth is the primary benefit of Year 12 Physics study, I am concerned that there will be insufficient time to achieve this. We also need to keep in mind that few teachers will have expertise in either area. Accordingly, external resources will be of critical importance to assist teachers to appropriately increase their level of expertise.

Organisation of content

The writers are continuing to insist that all science disciplines can be usefully subdivided into the three strands of Science Inquiry Skills, Science as a Human Endeavour and Science Understanding. This remains unhelpful here, as it is in earlier years. Senior Science students and teachers do not need to be reminded what Science skills or understandings are, or that the pursuit of Science is a human endeavour. Thankfully this is readily ignored.

Organisation of achievement standards

The desire to subdivide even further comes to the fore in the very first sentence. Now we are introduced to 'two dimensions: 'Physics Concepts, Models and Applications', and 'Physics Inquiry Skills''. Furthermore, they describe five levels of student achievement. The idea is to have some sort of uniformity in assessment across the country. If the writers were serious about common standards they would have recommended common exams across the country for senior science. As they have not, and the assessment processes reside with the states and territories, my suggestion is that the states and territories determine their own assessment processes and ignore what is given in the Australian Curriculum.

Mathematical skills expected of students studying Physics

A set of minimal mathematical skills is listed as to what can be assumed at the beginning of Year 11. No attempt is made to integrate the study of Senior Mathematics together with Senior Physics, which is to the detriment of both. I find it disappointing that some present-day school physics textbooks write $v = u + at$ as one of the equations of motion (for constant acceleration a). Any textbook using such notation should be excluded from any consideration. The correct form for this equation is $v(t) = v(t_0) + a(t - t_0)$, which is readily derived from $a = dv/dt$ once elementary integration has been learned in mathematics. By the end of Year 12 every physics student should understand such a

derivation as it underpins the critically important relationship between mathematics and physics. There is no room in physics for sloppy mathematical notation. The example given is just one of several such failings.

Representation of general capabilities

I am in complete agreement that Science, and Physics in particular, is an ideal context for further broadening and deepening the core life skills of literacy, numeracy, social development, usage of Information and Communications Technology (ICT), creativity, critical thinking and ethical and intercultural understanding. However, contrary to what is written in this subsection, the great contribution of science to society is that it is objective and knows no cultural boundaries. Cultural sensitivities should be subservient to science, and not the other way around. This may be an uncomfortable statement for some, but is the essence of scientific endeavour. Those who are familiar with Robert Pirsig's book 'Zen and the art of motorcycle maintenance' will recognise the hierarchy of quality with Science being associated with 'Intellectual Quality' which is above 'Social Quality', which is above 'Biological Quality', which is above 'Physical Quality'. Science can change society, but society cannot change Science. In this context it may be prudent to state explicitly that scientific statements are those that are able to be falsified by empirical evidence, and that scientific facts are not logical truths but those statements that have not yet been falsified despite repeated experiments. There is no room for cultural sensitivity.

Representation of cross-curriculum priorities

Senior Physics is unable to single out Asia, Aboriginal or Torres Strait Islander in any relevant context. Sustainability, on the other hand, has physics at its core.

Safety

It is vital that before any laboratory activities are undertaken consideration of potential hazards be considered. It should be made clear to all students that Occupational Health and Safety (OHS) issues are very serious in the workplace, and that they, as well as supervisory staff, all play an important role to ensure safety for all.

Animal Ethics

This discussion is of no relevance to Senior Physics

Unit 1: Thermal, nuclear and electrical physics

Apart from the unhelpful and repetitive usage of the three strands, the content of this Unit is very well organised and developed. The mathematical representations seem adequate, and I'm particularly pleased to see the usage of Δ to indicate change. Unfortunately, we soon see that Δ is not used consistently. In the mathematical representations of electrical circuits, time intervals are written as t rather than Δt . Similar problems arise for charge and potential differences. Such sloppy notation is unfortunate because it undermines subsequent development at the university level when differential definitions are given with the natural replacement of Δ with d . Sloppy notation creates needless confusion, even if the formula looks simpler. The goal is depth of understanding, and it is important to appreciate the difference, for example, between the notation t and Δt .

Unit 2: Linear Motion and Waves

Similar to Unit 1, the content is well presented, but the mathematical notation is once again needlessly sloppy and internally inconsistent. Here we have the infamous $v = u + at$, where t is explicitly defined to be the time interval. Yet later, on the same page, a time interval is written (correctly) as Δt . There is no need for such inconsistency. To spell it out in full detail, $a = dv/dt$ and so $\int_{t_0}^t a \, dt = \int_{t_0}^t \frac{dv}{dt} dt$.

Hence, for constant acceleration a we obtain $a(t - t_0) = v(t) - v(t_0)$. So there is no need to introduce a new notation u for $v(t_0)$, and the time interval $t - t_0$ should not be written as t , but can be written as Δt . I would hope that any associated textbook being developed would correct such deficiencies.

Achievement standard: Units 1 and 2

The listed achievement standards are of no practical value and should be ignored. I have never previously seen an attempt to express what a failing E-student should be capable of! If the goal is to have some uniformity of assessment across the country then the only way to achieve this is to have common exams. In the first instance this should be restricted to within the State/Territory jurisdictions. Having the first common exam at the end of Year 11 would give teachers feedback on their assessing of students during the year, and indicate the kind of standards required for Year 12. With a large cohort taking the exam, determining the grade cut-offs can be done on a purely statistical basis. There is no other practical defensible way.

I'd like to take this opportunity to state my opposition to the way the Australian Tertiary Admissions Rank (ATAR) is calculated. I do not believe that mapping a student's performance for many different academic disciplines onto a single number is warranted. The only reason to map multidimensional activity onto a single dimension is that hierarchies can only be established in one dimension. It would be much better to separately express the absolute and percentile performance of each student for each discipline studied. This will stop the undesirable hierarchy of global achievement and the downgrading, via scaling, of one academic discipline relative to another. My understanding is that it is the universities that demand a single number for each student. This request should be resisted. Instead they should find ways to admit students who present their results individually for the five or six academic disciplines studied.

Unit 3: Gravity and electromagnetism

The content is well developed and builds on the Physics taught in Year 11. Though angular motion is mentioned it may be helpful to explicitly include discussion around angular momentum, which is conspicuous by its absence. The formulas given look appropriate, and it is pleasing to see Δt being used for the time interval.

Unit 4: Revolutions in modern physics

It would seem that the primary purpose of this Unit is to make the students aware that Physics is a work in progress with exciting recent developments such as the discovery of the Higgs boson, and plenty still to be discovered such as dark matter and energy. This is laudable, but requires careful management to ensure that the new material is taught at the appropriate depth consistent with the

culture of Physics. Considerable professional development will be required for teachers to undertake this major task since these areas will be new to most of them. I suspect greatest variation in the implementation across states/territories will be for this Unit. This is not a bad thing with a review, say after three years, evaluating the various implementations and recommending how best to proceed. Personally, I am comfortable with the introduction of quantum theory and special relativity, though I have some concerns about the suitability of the Standard Model for Year 12 Physics. Given the attempted introduction of Modern Physics in this Unit it is particularly disappointing to yet again see t being used for a time interval rather than Δt . I would also prefer the notation l_p for the proper length rather than l_0 .

Achievement standard: Units 3 and 4

These remain unhelpful, and should be discarded. Achievement standards may be listed in the form of what is the goal for every student to attain, but they cannot be practically subdivided into any discrete levels of partial achievement. The reality is that students achieve these goals to varying and unpredictable degrees. So a mark of 100 per cent means all has been achieved, and any lower percentage a partial degree of achievement. This is good enough for all practical purposes.

Summary of the review of senior secondary Physics with explicit reference to the Scoping Brief

A) Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. the content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- *robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*
- *balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)*
- *scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.*

If we just concentrate on the content then the academic rigour is there with an appropriate cognitive development. The inconsistent usage of notation deserves some attention. In terms of balance, I do question the inclusion of the Standard Model in Unit 4. Just adding Special Relativity is sufficient to provide the extra challenge and awe for both students and teachers. I suspect greater depth in the more traditional content of senior secondary Physics would be more beneficial to the students. By construction, the states/territories have some flexibility in their implementation of the Australian Curriculum, and this is a good thing, which may be reviewed after say three years.

2. the soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to curriculum content in this learning area.

The proposed achievement standards corresponding to the A-E grades are unworkable. In quantitative sciences it makes no sense to determine grades directly from what has, or has not, been achieved due to the immense variety of possibilities. The best you can hope for is to specify what every student will know if they get 100 per cent for their assessment. Anything less will simply mean a partial achievement of what is intended. We all understand that percentage marks and grades, when determined from percentages, do not convey exactly what the student can, or cannot, do. This is not important. What is vitally important is that by using marks we communicate effectively back to the student what they have, or have not, understood. The listed achievement standards should be ignored entirely.

3. the appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across this learning area, and whether there are alternative approaches which could have been developed to introduce these themes.

By the time Senior Physics is being studied the cross-curriculum priorities cease to have any relevance.

4. the extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.

Senior Physics is reasonably solidly prescribed, with relatively little flexibility for changes in context or stages of schooling.

5. any significant treatment in the Australian Curriculum documents for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.

Explicit assessments for Senior Physics are well understood.

6. whether the curriculum documentation in this learning area is friendly for students, teachers, and parents, and for development of accountability and reporting measures which will lead to effective school community engagement.

To be friendly to anyone, the curriculum needs to be well-organised and use consistent notation. The subdivision of Senior Physics by ‘Science Enquiry Skills, Science as a Human Endeavour, and Science Understanding’ does not help anybody. Inconsistent usage of mathematical concepts, sometimes even on the same page, is very disappointing. The time interval Δt should be used consistently throughout. Despite the fact that many textbooks now write $v = u + at$, this is a poor choice of notation. Instead, this equation should be written more like $v(t) = v(t_0) + a(t - t_0)$ or $v = v_0 + a\Delta t$.

7. whether the curriculum for this learning area encourages a love of learning, a joy of discovery, and a quest for knowledge and related skills.

Whether this is achieved or not will primarily be determined by the quality of the teacher. I suspect the purpose of introducing the Modern Physics content in Unit 4 was to instill a sense of wonder in what amazing physics is yet to come. This has to be balanced with realistic expectations of what

existing teachers are able to teach. I am hopeful that Special Relativity is sufficient in this regard without adding the Standard Model.

B) Using four or five key content areas, skills, and/or topics considered essential in terms of the subject being evaluated, subject matter specialists will also assess how the Australian Curriculum for this learning area compares with the curriculum of two other relevant countries, focussing on their approach to the inclusion and design of key learning content, core knowledge and accompanying rationales

As for Foundation to Year 6, I used Singapore and Finland for the benchmarking exercise, see www.seab.gov.sg/aLevel/2014Syllabus/9646_2014.pdf and http://www.oph.fi/download/47678_core_curricula_upper_secondary_education.pdf, respectively. In terms of content overlap the two documents are very similar, and the primary difference to the proposed Australian document is that the latter adds Special Relativity and The Standard Model. In terms of a constructed Syllabus for Senior Science the Singapore presentation of Physics is outstanding. It does not hide that Senior Physics is a high stakes course, and so the Syllabus begins with a clear presentation of assessment issues. The content is given with great clarity and clear development in fifteen pages. The sectional subdivisions are readily recognisable to any teacher or student of Physics. There are no artificial overarching themes. The mathematics listed is appropriate and consistent. A number of internationally renowned textbooks are listed as supporting materials. A student successfully undertaking this course would be ready for university physics anywhere in the world. The syllabus is very prescriptive, with essentially no flexibility. Given that this is a high stakes subject I am comfortable with this aspect.

The Physics syllabus in Finland takes only six pages, and concentrates mostly on the content. This is subdivided using the usual physics headings, and again there are no artificial overarching themes. From the text it is clear that there must be external support resources provided, such as textbook information, but what they are is not evident. Given that the six pages of Senior Physics are combined with 227 pages of all of the Upper Secondary curricula, the presentation is less friendly than either the Singapore or the Australian versions.

6. Science (Years 7 to 10 and Senior Secondary Biology, Chemistry and Earth and Environmental Science - John Monash Science School)

Executive Summary

The authors of this report are senior science teachers at the John Monash Science School (JMSS) in Victoria: Mr Peter Thompson is a senior chemistry teacher, Ms Kathryn Grainger is a senior physics teacher with earth science experience and Mr Mark McTier is a senior biology teacher. All have previous experience teaching Years 7-10 science.

The new Years 7 to 10 science curriculum was found generally to be robust, balanced and flexible. There were some obvious omissions and some sequencing issues; both of which are addressed in detail in the following report. The three interrelated strands of Science Understanding, Science as a Human Endeavour and Science Inquiry Skills are considered to be relevant and useful in their delineation of content, application. The three strands also suggest – but do not restrict to – a teaching style. Science Understanding deals with concepts, models, laws and theories; it is about the content of the science curriculum. Science Inquiry Skills is about the way scientists work and the skills needed to be a scientist such as an understanding of the scientific method, measurement, practical techniques, using evidence to form hypotheses, scientific conventions and standards. Finally Science as a Human Endeavour attempts to connect the study of science to the wider world where it exists along-side political, economic, cultural, historic and social issues. Science as a Human Endeavour offers a link for the non-traditional science student to see the value, influence and relevance of science in everyday life. It also offers a good link for cross-curricula integrated studies. The value of this integration being most significant to the students ‘not particularly switched on’ to science as well as demonstrating how real science is an interdisciplinary, collaborative effort that is not isolated from world influences and can have world effects. Think of the science of climate change, nuclear power, genetic engineering, reproductive technologies – the science of each of these modern considerations is quite well understood, but the application of that science into the human world and all the implications of such are difficult, messy, confusing and very much complicated by morals, ethics, religion, politics, economics, history etc. To teach students the straight theories of the science and ignore the realities of science in society would be an over-simplification and an unrepresentative study. So the authors of this report fully support the three interrelated strands, but do not believe that it is necessary to devote equal time to each strand and would strongly encourage the work within Science as a Human Endeavour to be a cross-curricula study.

The seven general capabilities that also underpin the entire Australian Curriculum have some very strong links with science and some very tenuous ones. Numeracy, Information and Communications Technology (ICT), literacy and critical thinking are all core skills of a scientist, so those capabilities unquestioningly belong in any science curriculum. Personal and social capability, ethical understanding and intercultural understanding are more about the way the scientist interacts with

society, so while they may not be grounded in science, these are also skills required for scientists to interact with the community and communicate their scientific findings in the most effective way.

Of the three cross-curriculum priorities, sustainability is the one with obvious scientific links. Aboriginal and Torres Strait Islander histories and cultures and Asia and Australia's engagement with Asia do not have many natural connections and their inclusion seems contrived. Whilst the seven general capabilities are all still considered applicable for the reasons expressed above, it is recommended that the cross-curriculum priorities be revised. They may be Australia's political priority, but are they a relevant priority for our students?

As a tool for teachers to plan, assess and monitor student performance there have been some suggested changes with regard to clarification on the need to report against the general capabilities, greater detail in the elaborations and grouping some of the elaborations to offer more choice and depth rather than breadth of study; this curriculum document is easy to use and non-prescriptive in teaching style. If teachers wanted to investigate a content description (topic) by inquiry based learning styles, there are no barriers. There is flexibility for extension and extra support.

Curriculum documents from Finland and Singapore were used to benchmark the Australian Curriculum: Science. These countries were chosen because of their perceived student scientific competence evident through results in various international testing. Caution must be stated from the outset that there are many more factors at play in the academic performance of the students than just the curriculum, however; this blueprint for the policy and content for teaching science must have some impact. Generally, it is considered that the courses on offer in both countries go to greater depth in the core sciences of physics, chemistry and biology than the Australian Curriculum. A number of the topics taught in the 7-10 course in Singapore and the 7-9 course in Finland do not appear in the Australian science curriculum until the senior years. Finland briefly addresses earth and space science in some aspects of geography, Singapore does not include this science in its core studies at all. Whilst it is difficult to analyse the precise time allocated to teaching science, our rudimentary wrangling with the timetable indicated greater teaching time for science in both Finland and Singapore than Australia. Another difference appears to be a focus on teaching chemistry across junior and middle years, biology more heavily in junior years and physics more heavily in middle years.

The senior chemistry units in the Australian Curriculum document lack some rigour. The reasoning for this lack of rigour can be related to a number of factors. Firstly the sequence of chemistry units is neither the traditional chemistry course as seen in the benchmarking countries of Finland and Singapore, nor is it the more modern type of chemistry course as currently taught in some Australian states. Therefore the outcome of the chemistry course is a somewhat indecisive set of units that does not have the rigour or depth of either the traditional or modern type of chemistry courses. Secondly this lack of rigour is impacted on by the lack of chemistry content taught at Years 7 to 10. Finally the rigour is also impacted by some sequencing of concepts within the units, therefore the depth of knowledge cannot be extended. There are suggested amendments to the Science Understanding content of the chemistry units which leads to an issue of time required for each unit of work. The key strands of knowledge, skills and endeavor are well linked to the equally important

seven general capabilities. The links to the cross-curriculum priorities should focus on sustainability and not worry about Aboriginal and Torres Strait Islander culture and Asia and Australia's engagement with Asia, there is a huge scope for the sustainability priority to be embedded into many key concepts of the chemistry curricula.

Earth and Environmental Science cannot be compared to the existing environmental science course as the inclusion of earth sciences has significantly changed this course – for the better. It offers a new and very different type of science to be studied in senior secondary. For students interested in climate science, geology, environmental impacts and physical geography, this study uses the principles of physics, chemistry and biology to describe, explain, explore and infer information about our geologic time, current time and future. The introduction of Earth Science studies in Years 7-10 will give students the background knowledge to know enough about this subject to choose it and to delve into greater depth than previously able as there will be prior knowledge assumed. This is a holistic, exciting course showcasing science as a modern, interdisciplinary study. It cannot be benchmarked with Finland or Singapore as neither country offers a comparable course.

The senior Biology component of the Australian Curriculum is mostly a comprehensive and rigorous course. Overall, there is sufficient flexibility for teachers to develop engaging pedagogy and implement a wide variety of assessment tasks, which is a positive aspect of the course descriptions provided. However, it is evident that the general capabilities (ethical understanding and Intercultural understanding) and cross-curriculum priorities (including Aboriginal and Torres Strait Islander histories and cultures and sustainability) do not directly relate to the Senior Biology course and should not be included in the course descriptions unless clear links to the Scientific Understanding descriptors and specific examples are provided. Furthermore, Unit 1 Biology could include a section on Reproductive Biology, whereas Homeostasis should move from Unit 4 to Unit 2 to relieve a content-heavy Unit 4 course. Additionally, more detailed elaborations for each content description, particularly for Unit 3 and Unit 4 should be provided to give clarity to students, teachers and parents. The current brief descriptors of Science Understanding are too brief for the effective teaching and learning of the course. Examples of possible elaborations are found in the main report below.

Years 7 to 10 Australian Science Review

Undertaken by Mr Peter Thompson and Ms Kathryn Grainger

Section A: Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. The content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- *robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*
- *balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)*
- *scope for choice and flexibility in curriculum delivery without undue encouragement of the*

adoption of ephemeral or other practices which are not evidence based.

The content structure includes three interrelated strands: Science Understanding, Science as a Human Endeavour and Science Inquiry Skills, together they aim to provide students with the required knowledge and skills to proceed with further education in the science field. These strands are all worthy learning outcomes, however, the focus should mainly be on the two key learning outcomes of these strands, ie Science Understanding and Science Inquiry Skills, with the Human Endeavour strand being integrated across the teaching.

Science Understanding is the science knowledge (facts, concepts, principles, laws theories and models) that allows students to explain, predict and apply to new situations.

The following tables review the 7 to 10 curriculum according to the year level. The review is a summary of the major science understanding within the year level with suggested inclusions, deletions and alterations and suitable justification behind each comment.

Table 6.1: Year 7

Science Understanding	Inclusion	Deletion	Alteration	Justification
Biological sciences			In the Interaction between organisms (ACSSU112) the investigation / research sections could be a 'one of the following' choice.	<p>The logical sequencing of classification, food chains / webs together with the progression of the understanding is suitable to the level.</p> <p>The alteration referring to the choice of one investigation will enable the investigation to be completed at a greater depth, hence developing a more robust understanding.</p>

Science Understanding	Inclusion	Deletion	Alteration	Justification
Chemical sciences	<p>Within Mixtures and separation (ACSSU113), the laboratory safety and skills needs to be introduced.</p> <p>States of matter (ACSSU151), should be in the Year 7 (hence removed from Year 8), also the introduction of elements (ACSSU152) and simple atomic structure (ACSSU177 not including radiation).</p>			<p>The majority of Year 7 students will not have had access to a science laboratory in F to 6, it is essential to set the safety scene. So this unit needs to be completed first and can be taught in context of the mixtures section.</p> <p>The inclusion of the states of matter and atoms to be taken from the Year 8 and 9 sections as these are the basic build blocks of chemistry and they need to be introduced early to give some rigour and early structure to chemistry sciences.</p>
Earth and space sciences				<p>There is an uneven balance of water given to the 'Science as a Human Endeavour' compared to the content in the 'Science Understanding'. Otherwise the content is suitable and engaging.</p>
Physical sciences				<p>Suitable structure, sequencing and progression.</p>

Science Understanding	Inclusion	Deletion	Alteration	Justification
Year 7 Achievement standard	<p>First statement, should be a general comment regarding safety, i.e. <i>Students are introduced to the laboratory skills and safety of science.</i></p> <p>With the introduction of some chemistry science there needs to be some alteration / additions, i.e. <i>The use of the particle model to explain and predict properties and behaviour of different states of matter. They need to be able to describe the building blocks of matter using the current model of the atom and the basic subatomic particle and compounds.</i></p>			

Table 6.2: Year 8

Science Understanding	Inclusion	Deletion	Alteration	Justification
Biological sciences				The logical sequencing of Cells, Multicellular organisms together with the progression of understanding from the Year 7 level is suitable to this level.

Science Understanding	Inclusion	Deletion	Alteration	Justification
Chemical sciences	<p>To the chemical change, add the Acid / base of household consumables.</p> <p>A possibility to explore the nano world through the lens of reactions and properties of nano particles.</p>	States of Matter (ACSSU151) and Differences between elements, compounds etc (ACSSU152), to be moved to Year 7		The lack of rigour and basic sequencing at Year 7 in the chemical science area results in movement from this area of study, hence the introduction of reactions of household consumables is an excellent stepping stone and progression to the reactions unit in Year 9. The ability to study nano particles give more depth to the chemistry of reactions and properties of materials.
Earth and space sciences	Before Rocks (ACSSU153), the addition of 'Recognition of Age of Earth' and 'Geologic Time' this then leads into Rocks which should be classified as the 'Rock Cycle'			The introduction of the two sections on the Age of Earth and Geologic time will give a logical sequencing to the Rock Cycle and stages in the formation of rocks. The rock cycle leads to the idea of continuity of change.
Physical sciences				The introduction of energy and the different form of energy is a good progression from the Year 7 topic of Gravitational Forces.

Science Understanding	Inclusion	Deletion	Alteration	Justification
Year 8 Achievement standard	Need to add in comments to address the alterations. Into chemical changes, 'students need to explore the acid / base reactions of common household consumables', 'students will investigate the Age of Earth and Geological Time' and 'students will investigate new areas of science through the introduction of nano science'.	Remove the comment on the particle model to Year 7.		

Table 6.3: Year 9

Science Understanding	Inclusion	Deletion	Alteration	Justification
Biological sciences				The logical sequencing of Multicellular and Internal Systems and Ecosystems together with the progression of the understanding from the Year 8 level is suitable to this level.
Chemical sciences	Bring in from Year 10, the concept of using symbols to represent the reaction, also investigate the factors that affect the rate of reaction (ACSSU187).	The modelling of atoms and simple subatomic particles (ACSSU177 not including radiation) were removed to Year 7 when the atom was introduced	With the removal of basic atom structure (ACSSU177 not including radiation), revisiting the atom and subatomic particles with the lens of the reactions could provide a natural progression into reactions. This	The shifting of the sections within the chemical sciences with a clear focus of chemical reactions. By having the focus as reactions, the radiation section can still be taught but now from the reaction angle.

Science Understanding	Inclusion	Deletion	Alteration	Justification
			<p>section would also need the simple understanding of radioactive reactions to be moved into the area of reactions.</p> <p>In the study of combustion (ACSSU179) and its effect on the environment, there could be a list of explicit choices given (eg CO₂, Smog, H₂SO₄ acid rain) of which one could be used.</p>	<p>Therefore this topic would be a natural progression from the Year 8 topic of household reactions but to a great depth expanding the students' knowledge of reactions.</p> <p>As the focus of the course is related to reactions, using symbols to explain the reactions and investigating the factors that affect the rate of reaction would be desirable.</p> <p>The explicit choice of one from a number of combustion reactions and their effect on the environment, enables that section to be taught with a clear focus, in a more robust manner, also the choice enables some flexibility to the teacher and student.</p>
Earth and space sciences	<p>Before the 'Plate Tectonics' (ACSSU180) add in the Earth's place in the universe and the Earth itself, i.e. core, mantel and crust.</p> <p>The addition of the evidence for tectonic plates.</p> <p>Earth's magnetic</p>		<p>Addition of the role of the Earth's magnetic field and the movement of the tectonic plates</p>	<p>Prior to the idea of plate tectonics (ACSSU180) the understanding of the Earth's place in the universe and the common terms with Earth is required. So a progression from the Universe to galaxy to solar system to Earth</p>

Science Understanding	Inclusion	Deletion	Alteration	Justification
	field.			<p>(including its internal structure) then leading to Earth's magnetic field and plate tectonics based on Earth's internal structure.</p> <p>Examining the structure of Earth's interior provides evidence for behaviour of tectonic plates and provides a link to the factors causing events such as earthquakes and volcanic eruptions.</p> <p>Evidence of the reversal of magnetic field in Earth's rock record. This also links how we can deduce ancient occurrences like magnetic field reversal and what that might tell us about the present and the future.</p>
Physical sciences	Add in Electricity and the Electromagnetic Spectra as separate understanding		<p>Change the order of the dot points (ACSSU182). Reduce the amount on Energy transfer, wave and particle model.</p>	<p>The reordering of the dot points enable the sequencing of the unit to flow.</p> <p>The introduction of electricity is essential as there is a section that investigates the transfer of energy in an electric circuit (ACSSU182), however there has not been any</p>

Science Understanding	Inclusion	Deletion	Alteration	Justification
				reference to electrical circuits prior to this section and some background knowledge would be required. The introduction of the electromagnetic spectra is essential as a contextual idea for light.
Year 9 Achievement standard	Before global features there needs to be reference to the introduction of the earth structure. 'They explain earth structure by reviewing its place in the universe and then consider the formation of global.....'		The term chemical process should be more explicit and be chemical reaction as the focus of the chemistry science is based on reactions.	

Table 6.4: Year 10

Science Understanding	Inclusion	Deletion	Alteration	Justification
Biological sciences				The logical sequencing of Multicellular and Genetics and Evolution together with the progression of the understanding from the Year 9 level is suitable to this level.
Chemical sciences	After the atomic structure and properties (ACSSU186), with a close reference to	The section on reactions (ACSSU187) is removed to Year 9	The section on investigating how chemistry can be used to make substances, to be	The introduction of bonding is easily related to the atomic structure, also giving the

Science Understanding	Inclusion	Deletion	Alteration	Justification
	properties the introduction of bonding (covalent, ionic and metallic)		introduced after bonding.	course robustness, and the overall theme of the Year 10 Chemical science would be related to structure, properties and bonding. This therefore enables a theme that is well sequenced
Earth and space sciences	Reword one of the elaborations to read: 'Making connections among the age of the universe, the evolution of the universe, formation of stars and galaxies and how that has continued since the Big Bang.'	The factors that drive deep ocean currents is a rather complex topic and could be too onerous.	In the modelling a cycle (ACSSU188) concentrate on carbon cycles only, as these flow onto the next ideas of climate change in a more succinct manner	<p>The topics, although different, allow clear sequencing / progression within each of the topics.</p> <p>The important concept in the case of cosmology is to understand the connectivity among the super structures in our universe, so ideas of connections since Big Bang and inflation are fundamental.</p>
Physical sciences	The inclusion of work done on a system results in a change of energy.			<p>Doing work on a system results in a change in energy, this fundamental concept is missing and should be included.</p> <p>Otherwise, the topics and ideas within this section are well sequenced and at an appropriate level for the Year 10 student.</p>

Science Understanding	Inclusion	Deletion	Alteration	Justification
Year 10 Achievement standard	The inclusion of bonding changes the standard, '.... To make predictions about the properties of elements and how they bond'			

Table 6.5: Summary of changes

Science Understanding	
Biological sciences	The balance of the key core knowledge facts, concepts and themes has been completed with robustness and a clear direction that progresses through the Years 7 to 10 curriculum in a succinct manner. The easily followed progression points within the topics allow for the flexibility of pedagogy, which then can be determined by the institution or instructor.
Chemical sciences	The rigour of the chemical science understanding was affected by the lack of continuity of the course. With no safety/laboratory skills in the Year 7 curriculum, this vital aspect of any junior science program could easily be delivered in the area of mixtures and solutions. The Year 7 curriculum also lacked depth in its content, this was filled with topics and themes from higher levels of the chemical science sequence, in particular, matter, atoms and elements, as a consequence the logical progression of the higher levels were also affected. The content of the Year 8 curriculum could be refocused with the theme of chemical change/reactions using household materials and introducing nanotechnology, by using household material this adds the flexibility to the course. The Year 9 curriculum would continue the chemical reaction theme but at a more rigorous and detailed manner studying the reactions on an atomic level and including rates. This enables the Year 10 curriculum to focus on atomic structure, bonding and properties of elements.
Earth and space sciences	The majority of the content and balance of the Earth and space science is well presented, there are some minor suggestions to the Year 8 and 9 curriculum to improve the depth and sequencing of specific concepts. The content of the key knowledge
Physical sciences	The Physical sciences is introduced well at Years 7 and 8, however there needed to be more basic and core knowledge introduced at Year 9. This would enable electricity and the electromagnetic spectra to be introduced.
Overall	The Chemical sciences definitely needed to be reviewed in regards to rigor, sequencing and balance whilst the Physical science had some minor changes at Year 9. The other side of the coin is it refreshing to see the re-emergence of the Earth and space sciences.

Science as a Human Endeavour

There are two sub-strands, 1: Nature and development of science and 2: Use and influence of science. The sub-strands are related to the general capabilities and the cross-curriculum priorities.

Generally these were related to the science understanding. However, it was noted in some cases that these sub-strands were heavy weighted to one small section of the understanding (like with water in the Year 7) and in some cases there was no link to the understanding (ACSHE135) or the understanding was of another year level (ACSHE136) (ACSHE177). This point of no link to the understanding suggests that the endeavor was placed more in an attempt to populate the endeavour with cross-curriculum priorities that do not fit in with the understanding. If there are going to be cross-curriculum priorities they need to be relevant and appropriate to the understanding.

As there is usually a quite detailed list of endeavours, a choice of one of a few endeavours would be an advantage as this would enable the endeavor to be researched, reported, discussed etc. in detail giving the material the academic rigour that it deserves.

Science Inquiry Skills

There are five sub-strands: 1: Questioning and predicting; 2: Planning and conducting; 3: Processing and analysing data and information; 4: Evaluating; and, 5: Communicating. The skills are well presented throughout the entire curriculum and are appropriate to the skills of science.

2. The soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to the science curriculum.

The seven general capabilities that underpin successful, confident learners are intrinsic to the curriculum documentation and originate from the Melbourne Declaration on Goals for Young Australians (the Melbourne Declaration) (MCEETYA 2008). They are:

- literacy
- numeracy
- information and communication technology (ICT) capability
- critical and creative thinking
- personal and social capability
- ethical understanding
- intercultural understanding.

In the Melbourne Declaration, these essential skills for a 21st century learner are designed to

.. describe individuals who can manage their own well-being, relate well to others, make informed decisions about their lives, become citizens who behave with ethical integrity, relate to and communicate across ethical cultures, work for the common good and act with responsibility at local, regional and global levels. (Australian Curriculum and Reporting Authority, 2013)

These seven general capabilities to scaffold students toward this ambitious, yet worthy description are sound and there is no obvious need for the inclusion or deletion of any of the seven. Not surprisingly, there are stronger links within the science curriculum to some capabilities than others. For example, the least ‘connected’ of the general capabilities to the study of science is probably intercultural understanding. The general capabilities do not need to have explicit links to the domain of curriculum being taught, they exist as a cross-curriculum focus – one could make a similar comment about the tenuous link between numeracy and English perhaps? So keeping all seven of the capabilities as relevant across all the domains of the Australian Curriculum keeps the common theme running, encourages cross-curricula study and in the case of intercultural understanding, offers a humanistic or regional significance ‘lens’ through which to analyse scientific implications. An example of this is in the Year 7 Science as a Human Endeavour, ACSHE223 ‘Science knowledge can develop through collaboration and connecting ideas across the disciplines of science, elaboration: studying transnational collaborative research in Antarctica.’ Students could be encouraged to study an aspect of Antarctic research, perhaps the BICEP2 gravitational waves discovery, perhaps the Antarctic food chain and effect of human intervention in Antarctica. There are issues of politics, geography, history in the Antarctic scientific alliance and students could easily study this topic as a cross-curricula study with geography and history. Therefore intercultural understanding has a place in the science curriculum.

The content descriptions in each of the achievement standards links specific capabilities from the list of seven to the content and indicates where this link exists by use of an icon, (eg. a book for literacy, a calculator for numeracy to name two examples). The three most common links are literacy, numeracy and critical/creative thinking. This is a reasonable and expected priority. Mathematics is an essential tool for science hence the numeracy focus. A capability for articulate, evidence based communication explains the literacy requirement and the skill of critical and creative thought is essential to form hypotheses and evaluate claims based on evidence. The authors strongly support the prominence of these three general capabilities in the science curriculum. Literacy, numeracy and creative thinking are essential tools used everyday by scientists. They are the tools of the trade, and it is appropriate to explicitly teach students how to think critically and creatively, how a pattern in science may be expressed mathematically so inferences can be extrapolated or interpolated based on a measurable mathematical relationship and finally the need for clear, articulate explanation – communication of the science is becoming ever more important as our science investigation becomes more sophisticated. The other capabilities are not so much – the fundamental tools, (although ICT competency is important in measurement, instrumentation and communication), the other capabilities are generic. Again, if I can ask – to what extent are the capabilities grounded in science as a subject or are they generic?

As the students are now of the generation described as ‘digital natives’, ICT as an integrated tool in the science classroom – whether it be instrumentation, measurement, graphical analysis and representation, learning with simulations, writing apps or presentation formats – is appropriately linked to many achievement standards and should be synthesised into learning as a tool, not stand alone. The curriculum documentation does this.

Ethical understanding is appropriately included in related content descriptions and seems relevant and engaging for students. Personal and social capability is similarly cross referenced to group-work, team based learning and is also appropriately treated. Intercultural understanding is a more tenuous link. As the science curriculum affords minimal opportunity to engage this capability, other curriculum areas will be better suited. There is no need for its removal, it should be explicit that the capabilities are not expected to be 'equally weighted'.

The online Australian Curriculum, Assessment and Reporting Authority (ACARA) curriculum document has helpful, user-friendly links between the content descriptions and the elaborations. The icons are linked to specific examples of the relevance of that particular general capability to the content. This allows teachers to know the intended skill required and to pass that information on to students, leading to a more connected, holistic teaching and learning experience where students use the skills and knowledge of other subjects in their science learning; they expect to do so and are explicitly aware of this practice.

Explicit teaching and naming of the general capabilities within the science curriculum is considered appropriate, but there are concerns with expected reporting requirements. The reporting requirement is not clear in the ACARA documentation – will it be required to be reported or not?

Teachers are expected to teach and assess general capabilities to the extent that they are incorporated within each learning area.

State and territory school authorities will determine whether and how student learning of the general capabilities will be further assessed and reported.

For some students it may be necessary to adjust the levels of complexity the role and place of general capabilities in the Australian Curriculum remain the same for all students (ACARA 2013)

The final paragraph quoted above speaks to differentiation for individual students, which is appropriate. Presumably the rest of that point still allows for differentiation on the basis of need and student interest, however the overall proportionality of each of the general capabilities within the science curriculum should not change. This is the presumed meaning, however, it is unclear.

An improvement suggestion to assist teachers monitor student progress against the general capabilities would be to include a checklist. Our opinion is that reporting against the general capabilities should be included in the overall science report as these are fundamental tools and processes to being a scientist or scientifically literate person, not separate entities.

3. *The appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across science and whether there are alternative approaches which could have been developed to introduce these themes.*

The three cross-curriculum priorities identified by the Melbourne Declaration to be 'embedded' in all learning areas are:

- Aboriginal and Torres Strait Islander histories and cultures

- Asia and Australia's engagement with Asia
- Sustainability.

Sustainability has strong, obvious links to content in Environmental Science, Biology, Chemistry and Physics and it is appropriate to address sustainability when topic areas such as renewable energy, fossil fuel, food security, gene manipulation, green chemistry, Earth's structure including atmosphere, ocean health, carbon cycle, biodiversity, water, ecosystems and evolution. Embedding the sustainability priority is appropriate and balanced.

However the other two priorities, Aboriginal and Torres Strait Islander histories and culture and Asia and Australia's engagement with Asia, do not embed well into the science curriculum. The elaborations where these two cross-curriculum priorities are intended seem gratuitous and have tenuous link to the content. There is no judgement by the authors as to the validity of these two cross-curriculum priorities in other learning areas, but they are not appropriate in the science curriculum. In the content descriptions it could be appropriate to group together some of the elaborations and offer choice that would explore these two priorities, but not embed them. For example in ACSSU112, Human activity affecting interactions between organisms, in Year 7 Biological sciences, the last three dot points could be offered as a choice. The final one attempts to embed the Asian/Aboriginal priorities:

Research specific examples of human activity, such as the use of fire by traditional Aboriginal people and the effects of palm oil harvesting in Sumatra and Borneo.

This, together with the other points in the elaboration would require a lot of time to teach and research (remembering they are Year 7 students so will need help in research skills). So rather than mandate the 'embedding' of the cross-curriculum priorities, include them as options/choices in the content descriptions. In that same year level in the strand of 'Science as a Human Endeavour' Year 7 students are also required to:

investigate how land management practices of Aboriginal and Torres Strait Islander peoples can help inform sustainable management of the environment.

Again this is a very big question, not a bad question, but one would question whether it belongs in science and would not be better placed in human geography?

Again to restate; no comment is made on the appropriateness of the cross-curriculum priorities with regard to the entire curriculum, but the relevance of the following two cross-curriculum priorities - Aboriginal and Torres Strait Islander histories and culture as well as and Asia and Australia's engagement with Asia - in an already time poor science curriculum at Years 7-10 is challenged.

The question of whether there are alternative approaches which could better introduce these themes assumes the themes should stay in the science curriculum. As explained above, the only one directly linked to the core content is sustainability. The other two priorities would be better placed in human geography, studies of society and environment, history – in other words the humanities field. Yes the links are possible in science, but in doing so there is a risk of broadening the curriculum and lessening both focus and rigour. The types of investigations outlined in the elaborations require

time to research and time to teach different skills from the classic science inquiry skills. Although the elaborations are voluntary, teachers will use them as a guide and plan their lessons based on suggestions in the elaborations, therefore making this section as 'lesson friendly' as possible means that the curriculum documentation is more useful to teachers.

One sensible compromise if inclusion is a necessity would be to link the same elaboration task into the humanities curriculum so efficiencies could be achieved across the curricula. This would require careful planning across the faculties within schools, but schools should be encouraging this type of study to demonstrate the breadth, complexity and inter-disciplinary nature of most science questions.

4. *The extent to which the science core content allows flexibility in classroom delivery for different schools and different stages of schooling.*

Suggested changes to the core content have been made in Part 1 of this report. Those changes have been made to improve the robustness, balance and flow of the curriculum.

There is a balance in the core content – with some modification – that allows flexibility in the classroom, across the school and among other schools all following the same curriculum. This is a good thing. The authors would still advocate that there is too much prescribed content in the elaborations, particularly in Science as a Human Endeavour and would suggest grouping to offer choice to students and teachers to accommodate personal interest, local importance and personalisation and differentiation of the curriculum.

On a simplified level, Science Understanding is generally a very outcome focused, 'standards approach' strand that would lend itself more toward direct instruction, small group work and text book supported curriculum. Science as a Human Endeavour offers more research opportunities, collaborative work and inquiry based learning; a constructivist approach which gives scope for a very different approach within the classroom already between just Human Endeavour and Understanding. Finally Science Inquiry Skills builds practical scientific skills in thought and practice to make links between theory and experimentation; it affords the opportunity for creativity, precision and persistence. The opportunity for high levels of student engagement due to intrinsic variation of task type and learning experience within a class is significant and highly desirable.

The scope and sequence documents, again with the recommended core content and choice modifications, clearly set out the progression through each of the four sciences; Biology, Chemistry, Earth and Space and Physics. This offers opportunity for teachers to easily accelerate students if considered appropriate and take remedial action also where appropriate.

There is flexibility in being able to either offer acceleration or remediation across a science and there is also sufficient flexibility in the documents to encourage depth in a topic of study rather than just acceleration.

In summary, the science curriculum documentation offers excellent levels of flexibility to teachers, schools and students whilst still maintaining very clear expectations of the achievement standards.

5. *Any significant treatment in the science curriculum documentation of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics?*

The analysis of the degree of flexibility and the concern for ‘over prescription’ has been grouped as they are closely related. Whilst the previous question dealt with the question of flexibility, this question assesses the possibility of the curriculum documents being too prescriptive and forcing a particular approach to meet rigid assessment requirements, content descriptions or even classroom activity. As outlined above, the three strands lend themselves, but are not exclusive to different styles of teaching and learning. There is nothing in the content descriptions (or the elaborations) that is prescriptive to a particular pedagogical or epistemological approach. Whilst there are obviously some conventions to be followed in how scientific experimentation is conducted, the curriculum documentation offers a very high degree of autonomy and flexibility for the school, community, teacher, class and/or individual student, as appropriate, to pursue their study of each scientific topic with autonomy, provided the outcome satisfies the achievement standard.

The documentation does not detail assessment implications, apart from some broad references. On p. 19 of the ACARA science curriculum document it reads:

The science curriculum emphasises inquiry-based teaching and learning..... Opportunities for student-led open inquiry should also be provided within each phase of schooling.

It is assumed that the state education authorities will have input on assessment and reporting. Until that level of detail is known, the rigidity of assessment cannot be assumed or implied from this document.

It is expected that teachers will use the achievement standards to pre-test for prior knowledge and to identify areas of weakness so content can be personalised for the class and for individuals. There is no reference in the document to reporting on pre-testing. This is appropriate as it is a tool for teachers and the school to measure the effectiveness of the teaching program and improved student learning, both of a cohort and of an individual.

There is reference to formative and summative assessment as well as external assessment – the National Assessment Program – Literacy and Numeracy (NAPLAN) and the National Assessment Program (NAP). Formative assessment used as an opportunity to offer extension or additional support is common practice and, rightly, there is no mention of prescriptive reporting on formative assessment, apart from feedback to students to inform their learning practices. Summative assessment reporting against the achievement standard will be used for formal reporting to parents twice yearly, as most schools would currently do. If schools are on-line reporting, then the summative assessment feedback presumably could be provided through that platform.

One area of concern is the requirement to report on student progress against the general capabilities. This concern has been previously raised in section 2 of this report. It is unclear whether there is expected to be any reporting on cross-curriculum priorities.

6. *Is the science curriculum documentation friendly for students, teachers and parents, and for development of accountability and reporting measures which will lead to effective school community engagement?*

The question posed here is whether the documentation is friendly for students, teachers and parents? Should curriculum documentation try to be friendly to each of these groups? It could be argued that this documentation is written for teachers to deliver effective learning to the classroom with academic rigour, appropriate structure and sequence. There is nothing in the curriculum documents to discourage parent or student access, but this documentation should be written for teachers, that should be the target audience. It is appropriately written for teachers (although the detail in the general capabilities is rather too extensive and the authors cannot see this being a helpful document for the classroom teacher).

The website with its filter facility, selection menus, live links, plain English and logical formatting is easy to navigate and very accessible in form, language and style.

7. *Does the science curriculum encourage a love of learning, a joy of discovery and a quest for knowledge and related skills?*

Students are naturally curious, yet somehow over middle years' science, a number seem to lose that curiosity and quest for knowledge. The content in the science curriculum essentially covers the basics required for a scientifically literate human being. The wonder and excitement of science is often not conveyed to the students if they feel they are learning about old ideas from ancient scientists so it is the responsibility of the teacher to demonstrate the relevance of the 'old science' (Newton's Laws have not changed), to modern life. The curriculum cannot mandate how to do this – it is the art of the teacher. Support from periodicals such as Cosmos magazine, New Scientist, CSIRO science by email, tweets from NASA, all of these supplementary sources can help provide the 'spark' which links the established, conventional scientific theory with modernity. The quality, dedication and personal interest of the teacher drives this process, not the curriculum documentation.

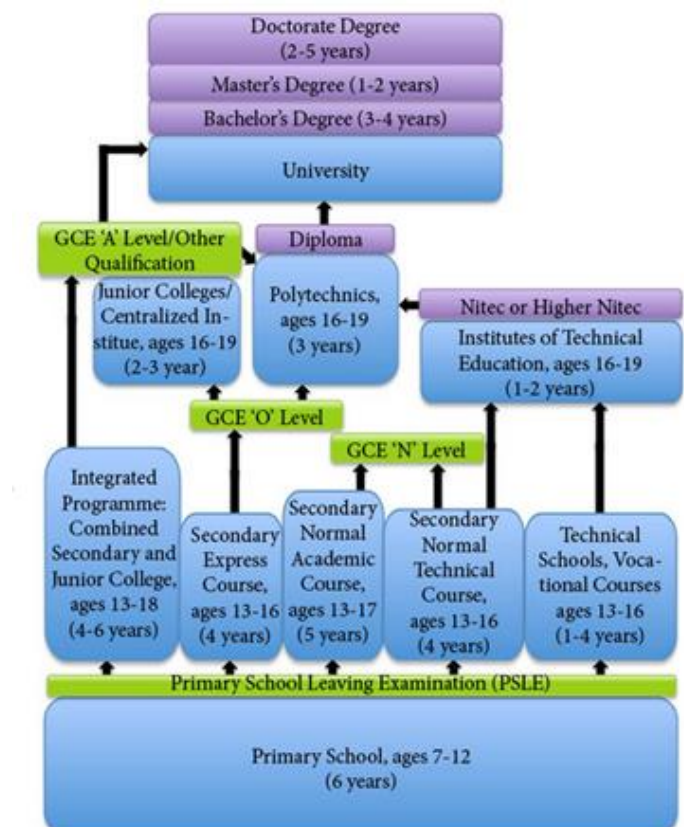
There is nothing in the documents that discourages a love of learning, a joy of discovery or a quest for knowledge.

Comparison of Australian Curriculum: Science Years 7-10 with curricula from Singapore and Finland

Introductory notes about the science curriculum of Singapore

In Singapore, there is an exam after primary school, the Primary School Leaving Exam (PSLE). This exam determines the educational pathway of students, as this leads to five different types of schooling. Therefore this is effectively streaming the secondary schooling at a very early age.

The pathway of the education system is shown in the diagram below.



The schooling areas are Technical/Vocational, Secondary Normal Technical, Secondary Normal Academic, Secondary Express and Integrated Secondary and Junior College. The different pathways lead to varied qualifications, hence it would be suggested that it would be very competitive to access the top streams.

This benchmarking will focus on the Secondary Normal Academic and Secondary Express, the difference is the Secondary Express Course complete the syllabus in 4 years whilst the Secondary Normal Academic completes the syllabus in 5 years with a small number of outcomes optional for the Normal Academic.

The central framework of the science syllabus is 'Science as an Inquiry'. Within this framework there are three domains:

1. Knowledge, understanding and application

2. Skills and process
3. Ethics and attitudes.

These three domains are linked to roles in modern daily life:

1. Science in daily life
2. Science in society
3. Science and the environment.

The four competency domains that underpin the syllabus are:

1. Curriculum literacy
2. Global awareness and cross-cultural skills
3. Critical and Inventive thinking
4. Information and and communication skills.

The main domains are structured like primary school, that is, the Knowledge is based on four themes which aim to develop links between themes (with the introduction of 'Scientific Endeavour' which is to deepen students understanding of what science is and how it is practiced and applied), the skills also flow on from primary school and ethics which develops curiosity, creativity, objectivity, integrity and open mindedness.

The time devoted to the science knowledge is 85 per cent, the remaining 15 per cent is teacher's choice for more engaging/school based programs, and the lessons per week vary from 6 per week for the Express Course to 5 per week for the Normal Course, with each lesson 35 to 40 minutes. The teaching are advised not follow the syllabus too rigidly but to exercise their professional judgement in implementing it. Teachers are encouraged to use a variety of approaches in their teaching.

The teaching themes within the knowledge domain are Diversity, Models, Systems and Interactions, and these themes are developed with links. These links are through the sequential learning of the major science subjects, Biology, Chemistry and Physics. Notably there is no Earth science or Space in the Singapore science syllabus.

Theme 1 - Diversity: looking at matters' physical and chemical properties and separation and looking at living things. This therefore covers chemistry and biology.

Theme 2 - Models: looking at models of cells, matter and light. This covers all three science areas.

Theme 3 - Systems: looking at human digestive, human sexual reproductive and transportation in living things and the electrical systems. This therefore covering biology and physics.

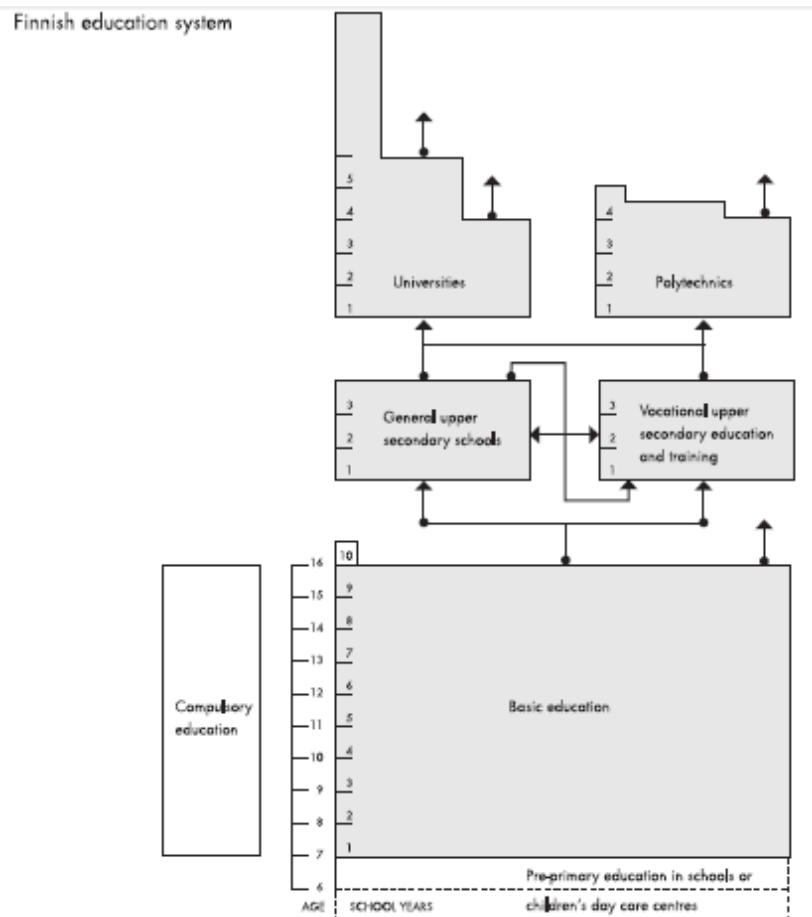
Theme 4 - Interactions: looking at forces, energy, work, sound, heat, chemical change and ecosystems. This covers all three science areas.

The syllabus is weighted towards biology in the early years with little physics, whilst the later themes have the weighting towards physics.

The themes are extremely well linked/integrated and have excellent continuity therefore progression points would be easily tracked. These themes are not as broad as the Australian science curriculum due to the exclusion of Earth and Space.

Introductory notes about the science curriculum of Finland

Finnish schooling is represented by the diagram below:



Some general comments for a brief overview of the curriculum of Finland:

1. The core curriculum is set by the Finnish National Board of Education but may be modified to include segments specific to a region or a school as decided by that school. The current curriculum came into effect in 2005 and is under review at the moment. The new draft curriculum will be available for perusal at the end of 2014 and the revised curriculum is expected to be implemented in August 2016.
2. Schooling starts at 7 years of age. Special provision may be granted to start at 6 at the discretion of the school and by application of the parent(s).
3. The section of curriculum mapped and compared with Australian Curriculum: Science Curriculum Years 7-10 is in the Years 7-9 in Finland, students are aged between 13 and 16 years of age.

4. After the basic education, students select to attend either general upper secondary which is a continuation of their basic schooling and a preparation for university or vocational schooling and training.
5. General upper secondary school in Finland is for 3 years where the age of the student will be 17 to 19 years. There is a high degree of choice in the general upper secondary level. Science still has compulsory sections, but specialist modules are available to add on to the compulsory units. The upper secondary school curriculum is not constrained into year levels and teaching is not tied to year level classes. Upper school teaching is encouraged to follow an integrated model, across the curriculum. It is interesting to consider whether the inclusion of compulsory science in upper secondary school, (2 modules of biology, 1 module each of physics and chemistry and 2 modules of geography where one of those modules would be considered similar to our Environmental Science course), adds gravitas to the overall science curriculum?
6. There is flexibility for the curriculum to be separated into subjects within basic education, or integrated.
7. There are seven cross-curricula themes, namely:
 - Growth as a person - development of life management skills
 - Cultural identity and internationalism - an understanding of the ‘essence’ of Finnish and European culture
 - Media skills and communication - media’s position, importance and how to better use it
 - Participatory citizenship and entrepreneurship - civic involvement, a perspective from a different viewpoint and to invest in entrepreneurial thinking
 - Responsibility for the environment, well-being and a sustainable future - guide student thinking to act for the good of the environment and human beings
 - Safety and traffic - identifying safe and encouraging responsible behaviour
 - Technology and the individual - importance of technology in our everyday lives considering ethical, moral and equity issues
8. Whilst the number of school weeks in Finland is closely matched to Australia, the number of tuition hours seems higher. The curriculum documentation states 30 hours per week of subject teaching in Years 7 to 9.
9. Classes are 60 minutes duration, with some flexibility, and the documentation states that 45 minutes of this time must be spent on ‘instruction’. It is unclear exactly what this means, but is a point of interest.
10. The earlier middle years of secondary schooling are more biology and geography (which is considered a science) focused. At Year 9, there is more physics. Chemistry seems to be evenly spread among the years.
11. By the end of Year 9, Finnish students have covered concepts in physics, chemistry and biology that would not be attempted until Unit 1 or 2 Victorian Certificate of Education (VCE) in those subjects.

Table 6.6: Comparative table of the sciences taught in Australia, Singapore and Finland Years 7 to 10 (only Years 7 to 9 in Finland)

Australian Curriculum Years 7-10	Singapore Curriculum Science content Years 7-10	Finnish Curriculum Science content only Years 7-9
Biology	1: Diversity of living things 2: Cell - the basic units of life 3: Transport system in living things 4: Human digestive system 5: Human sexual reproductive system 6: Interactions within Ecosystems	1: Nature and ecosystems (classification, ecosystems, biodiversity) 2: Life and evolution (cells, evolution, biotechnology) 3: The human being (genetics, body systems, human sexuality) 4: The common environment (ecologically sustainable development, considering one's environmental impact) 5: Geographical skills (global environmental and development problems; greenhouse effect, ozone depletion, desertification, pollution, population growth and food security) 6: Analysing the world 7: Analysing Europe 8: Analysing Finland
Chemistry	1: Diversity of matter by physical properties 2: Diversity of matter by chemical composition 3: Diversity of matter using separation techniques 4: Matter - atoms and molecules 5: Chemical changes	1: Air and water (atmospheric substances, combustion reactions, properties and environmental effects) 2: Raw materials and products (elements in Earth's crust, recyclability, electrochemical processes, reaction rates, balancing equations, redox reactions) 3: Living nature and society (photosynthesis, combustion, oxidation, organic compounds, food chemistry)
Earth and Space Science	Not in the science curriculum, this is a major difference	No space science. Geography covers some Earth Science and there is a strong Earth focus through chemistry, biology and physics due to the cross-curriculum priority.
Physics	1: Ray model of light 2: Electrical systems 3: Forces 4: Energy and work 5: Sound Energy and vibrations 6: Heat and its Transmission	1: Motion and force 2: Vibrations and wave motion 3: Heat 4: Electricity 5: Natural systems (including radiation and energy)

Singapore:***Content***

Singapore's content is logically set out with the themes and these themes enable clear links between the core subjects. Individually the core subjects have units that have been designed to clearly flow sequentially throughout the secondary years giving the Singapore course some balance. The structure and sequencing of the units in Singapore is far more logical compared to the Australian Curriculum Years 7 to 10, even to the stage that the core subjects are weighted differently in each theme. The biological and chemistry content is rather consistent throughout the four years, whilst the physics content is weighted more towards the end of the four years, this would be a deliberate decision after assessing the robustness of the content. It should be noted that the Singapore science curriculum does not contain Earth and Space science, whereas the Australian Curriculum does, this is not to say that Earth and Space are not completed but are in a different subject study design. The removal of the Earth and Space component does create time, this time then can be used to improve the learning outcomes of the core subjects. Within each topic, the course is very detailed and provides great depth into the unit, this depth of knowledge provides the academic rigour of each core subject. This detail is of greater depth than the Australian Curriculum, as this can be seen by Singapore's inclusion of Electrical systems and Work to the physics content, both of these were not included in the Australian Curriculum. In summary, the Singapore curriculum, which is seen to be very successful is not as broad in content but is taught to a greater depth. This point is aided by the selective streaming of students via the Primary School Leaving Exam, hence having the academic talent in the Express and Normal Academic courses.

The content descriptions of the Australian Curriculum content are clear and concise, these understanding, skill and endeavour strands are written in separate section, therefore a clear link between each strand is not evident. The Singapore document has very similar strands yet is set out differently, as the learning outcomes are displayed all together under the key understanding, therefore giving an extremely clear link between the three learning outcomes (knowledge, skills and ethics).

Skills

Singapore's skills are clearly set out within the framework of the knowledge, understanding and application and they are essentially the same as the skills set within the Science Inquiry Skills. However this is science and it is assumed that the skills of science would not differ from country to country.

General capabilities and cross-curriculum priorities

Singapore's domains in modern life and competency domains are effectively the same as Australia's general capabilities and cross-curriculum priorities. Singapore's domains are presented like the Australian capabilities and priorities in that they are stated clearly as a compulsory aim of the science curriculum and are cross disciplinary. However the Australian Curriculum highlights these capabilities and priorities more clearly by using icons within Science Understanding and Skills.

Finland

Content

Finnish students spend three years in upper secondary schooling. Yet even in the basic education of secondary schooling in middle Years 7 to 9, the science curriculum covers the basic sciences of physics and chemistry in greater depth than the Australian 7-10 curriculum. Biology seems to be on a par with the Australian 7-10 curriculum. From the brief overview that has been possible in making a comparison between the Australian and Finnish science curriculum it would appear that Finland takes its students to greater depth in the fundamental sciences, at an earlier stage in their schooling. For example the Finnish physics curriculum Years 7-9 covers the topics of heat, (basic laws of heating and cooling, laws of thermodynamics and the mathematical relationships to quantify these behaviours) and electricity (including magnetic and electric forces, dc circuits, electromagnetic induction, electricity generation and distribution), in some detail. Heating and cooling is not currently addressed to any significant extent in the Australian science curriculum apart from kinetic molecular theory (changing states) and the electricity component of our curriculum is mentioned as only one brief elaboration point in Year 9 'investigating factors that affect the transfer of energy through an electric circuit'. The Australian senior secondary curriculum for physics is the first time students would encounter electromagnetic induction, electricity generation and distribution and detailed dc circuit analysis. Since electromagnetic induction is the core principal behind electricity generation for most of the world, including Australia, it is an important inclusion for a general science literate citizen to know about, especially as Australia and the rest of the world grapples with power generation questions into the future. There is insufficient detail in the curriculum documentation to make in-depth comments or to draw too many conclusions. The new curriculum documentation due out in August 2014 would be very interesting to review. A discussion with Finnish teachers and school leaders would also be useful as some erroneous conclusions may have been drawn from the limited curriculum documents available for review.

Skills

The skills required to be attained for successful completion of each area within the sciences is clearly set out in the 'Final Assessment Criteria' section of the Finnish documentation. The skills are very similar to those in the Australian science curriculum.

Australian Curriculum: Chemistry review

Undertaken by Mr Peter Thompson

The chemistry curriculum is very much reliant on the foundations developed at the junior level. There are some weaknesses in the Year 7 to 10 chemistry curricula which need to be addressed. These weaknesses are due to the lack of rigour and balance in the sequencing of the junior years and have been identified in the science 7-10 review.

The senior secondary chemistry includes the following units that are taught of the two years of senior chemistry.

- Unit 1: Chemical fundamentals, structure, properties and reactions
- Unit 2: Molecular interactions and reactions

- Unit 3: Equilibrium, acids and redox reactions
- Unit 4: Structure, synthesis and design.

The overall ideas throughout the units are logical and well sequenced.

It is my assessment that, in inspecting the units in depth, there are some holes in the academic rigour, balance and sequencing within the units, especially Units 1 and 2.

Unit 1

In the properties and structure of atoms: The introduction of the atomic fundamentals is a logical beginning, it should be clearly noted that the electron configuration (ASCH017) should clearly state that it is to the subshell level. The introduction of the two instruments, the AAS (ACSCH019) and the Mass spectrometer (ASCH023) has no indication to what level the understanding is required so clarity is needed. These points indicate that the science understandings need to be written with greater clarity.

In properties and structure of materials: The introduction of the nanomaterials (ASCH028) seems to be thrown in without any logical sequence or link to the previous work completed. With bonding (ASCH029, 031, 032 and 033), the beginning of these topics will be made easier if the rigour of the key and basic knowledge was improved at the Year 10 level, as bonding has not included, so the rigour of the Year 10 science curricula needs improving. The covalent bonding component (ASCH033) is lacking in content depth, as there is no mention of the intermolecular forces, shape and polarity in Unit 1. These key concepts of intermolecular forces, shape and polarity (ASCH055, 056, 057 and 058) are introduced in Unit 2 and therefore the sequencing misses the chance to relate these bonding concepts to the properties of carbon compounds (ASCH035) in a more logical manner.

In chemical reactions: There is limited reference to mole (ASCH039) which is an essential corner stone to any further chemistry study, it needs to be completed early in this topic. Without the mole completed late, other topics e.g. energy output (ASCH037) can be introduced to a limited depth.

A concern of moving topics into Unit 1 will be the length of time available to complete all tasks. To address this issue of time in Unit 1, an increased amount of the bonding topic (the basics of ionic, metallic and the beginning of covalent bonding) should be introduced and addressed in the Year 10 science curriculum. Therefore the bonding in Unit 1 Chemistry will be more of a recap of the bonding basics and more time be dedicated to the key concepts of intermolecular forces, shape and polarity.

Unit 2

Intermolecular forces and gases: Some of these initial points above on intermolecular forces, shape and polarity (ASCH055, 056, 057 and 058) suggest it should be in Unit 1, in the property and structure area, as they are much more related to this area of knowledge and can be complemented by the properties of the carbon compounds. Completing these sections earlier in the course in Unit 1 will develop greater depth of understanding giving a greater foundation to the future work in chemistry. With the suggested movement of intermolecular forces, shape and polarity (ASCH055, 056, 057 and 058), chromatography techniques (ACSH059) does not fit into this area. The detail of gas behaviour (ACSCH060) can be extended by suggesting suitable gases to study, this study then

can be related back to the understanding of molecules properties, hence a clear crossover of understanding can be created and reinforcing properties.

Aquatic solutions and acidity: the content is clear and in a logical position in the curriculum. The concepts of stoichiometry (quantities in chemistry) is not mentioned in the understanding and it is an essential concept that is required to be introduced at Year 11, so the concept can be practiced and refined before Units 3 and 4.

Rates of chemical reaction: the content is clear and in a logical position in the curriculum.

The concern of this unit is the rigour, as the major concept of stoichiometry had not been introduced and with the movement other topics the logical sequence of some early topics is lacking.

Unit 3

Chemical equilibrium systems: the content is clear, however the sequencing of topics could be improved by moving Le Chatlier's Principle (ACSCH095) to before the effects of changes (ACSCH093 and 094). Within this unit the rigour needs to be greatly improved, as there is only a limited amount of volumetric analysis (titration), this analysis is extremely important; the volumetric analysis could quite easily be a unit by itself.

Oxidation and reduction: the content is clear and in a logical position in the curriculum, this topic can be related volumetric analysis with volumetric analysis of redox reactions.

The concern of this unit again is the rigour, as another major technique (volumetric analysis) is lacking and needs to be covered in far greater depth.

Unit 4

Properties and structure of organic: The sequence of the work is clear and understandable. To give greater depth to the understanding, lipids could be added to the study of organic materials (ACSCH129). There are a number of instruments used to analyse the covalent compounds (ACSCH130), there is no mention of the use of the proton or carbon-13 NMR¹, the introduction of this technique would give greater depth to the course.

Chemical synthesis: the content is clear and in a logical position in the curriculum.

Section A

Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. The content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- *Robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*

¹ Carbon-13 NMR is the application of nuclear magnetic resonance spectroscopy to carbon. It is analogous to proton NMR and allows the identification of carbon atoms in an organic molecule just as proton NMR identifies hydrogen atoms.

In regards to the robustness, whilst the content is generally quite strong and robust there are some key areas of learning that are either neglected, lacking or not explicitly stated in the key understanding.

As the chemistry curriculum is one where the core understanding and content have many links between topics, these links therefore are required to be sequenced perfectly as each topic is usually a foundation for future understanding.

There are issues with the structure and sequencing of Unit 1, this is evident where the logical location of intermolecular forces, shape and polarity is in Unit 1 with properties and structure, however the topic is in Unit 2. Also in Unit 2 there is no clear reference to stoichiometry in the understanding, but the topic of stoichiometry is alluded to in the key skills. This topic of stoichiometry is a key corner stone of chemistry and needs to be clearly stated and practiced in Year 11.

The sequencing and detail of these early units can be questioned, it is noted that the moving of such core concepts may impact on the overall time of the unit. If this is the case, a major restructure of the content of Units 1 and 2 could be needed.

The rigour of Unit 3 is also questioned by the lack of volumetric analysis; this technique is essential and could easily be linked into the core understanding in a major way.

- *Balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)*

The balance is generally good in terms key core and basic understanding, however the inclusion of some major topics is essential, namely stoichiometry into Units 1 and 2 and volumetric analysis into Unit 3. Both of these areas of study are essential building blocks in chemistry and they are the foundation of the core and key understanding of chemistry hence they need to be treated with due respect within the curriculum.

- *Scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.*

The chemistry course has been designed with the ability to be flexible in curriculum delivery, this delivery would be designed by the pedagogical style of the teacher or school and the topic taught. The content of the units is varied and hence allow for the flexibility of the pedagogical styles, but it is clear that some styles may not fit.

2. The soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to curriculum content in this learning area.

The general capabilities are well covered in the chemistry curriculum as there are well founded links between the capabilities and the science understanding. The achievement standards in concepts, models and applications are well linked to the science understanding for the chemical systems but not so for the chemical context. The achievement standards in inquiry skills are again well linked to the science understanding.

With this rather poor link between chemical context and concepts, models and applications more detailed examples should be provided otherwise this achievement standard may be forgotten to be addressed when teaching the curriculum.

3. The appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across this learning area, and whether there are alternative approaches which could have been developed to introduce these themes.

The appropriateness and relevance of the three cross-curriculum priorities:

- 1. Aboriginal and Torres Strait Islander histories and cultures*
- 2. Asia and Australia's engagement with Asia*
- 3. Sustainability.*

The curriculum acknowledges that the cross-curriculum priorities for chemistry vary. It is suggested there are limited contexts for the introduction of Aboriginal and Torres Strait Islander histories and cultures and Asia and Australia's engagement with Asia, and, in reality there is a very limited context for the suggested examples.

The priority of sustainability is one where chemistry could either teach as green chemistry in a unit or embed the priority into many of the units. With the importance of both sustainability and green chemistry, it would be better to embed the sustainability priority throughout the entire chemistry curriculum as green chemistry; this would therefore enable green chemistry and sustainability to be highlighted throughout the whole chemistry curricula.

In summing up, it should be the sustainability priority that is the focus of chemistry, leaving the other two priorities to other more suited subjects, as by just mentioning them is not doing these important priorities justice.

4. The extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.

The chemistry course allows for great flexibility within the classroom, however this flexibility would be teacher dependent but the curriculum definitely provides ample scope for a variety of teaching techniques.

The chemistry subject has significant practical aspects therefore enabling the core content and understanding to be enhanced with the practical work.

5. Any significant treatment in the Australian Curriculum documents for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.

The assessment in Units 1 and 2 can be varied in the method as there are clearly different ways to assess the same topic. With chemistry having a good proportion of possible practical work, using this practical work as an assessment tool is essential as they are excellent to assess many of the skills in context of the topic. The Units 3 and 4 should have some more uniformed type of assessment across the whole curriculum so some comparisons of ability can be made on student outcomes. Although,

the assessment still can be varied, practical reports, use of second hand data, presentations are all suitable assessments that could be used to observe the outcomes.

6. Whether the curriculum documentation in this learning area is friendly for students, teachers, and parents, and for development of accountability and reporting measures which will lead to effective school community engagement.

The document is clearly friendlier to the teachers compared to the students and parents; however there could be more clarity in a number of the dot points within the units. This would not only assist the teachers (especially the new teachers) but assist the students and staff to gain a better understanding.

The achievement standard sheets are excellent in the development of accountability for the teachers and are easily read for students and parents. These sheets can easily be modified for the use of assessment, this can be completed by having a 4 or 5 point scale for each concept. It would be possible to link similar concepts together to get an overall progression point of a student's understanding for that concept.

7. Whether the curriculum for this learning area encourages a love of learning, a joy of discovery, and a quest for knowledge and related skills.

The course is very interesting and should be able to excite students; the reason is that the curriculum can be easily populated with practicals and research.

However the biggest influence on the joy of discovery is the teacher. With passion the teacher should be able to impart excitement and value to their students and this curricula is flexible enough to provide a variety of teaching methods.

Section B

Curriculum Comparison - Using four or five key content areas, skills, and/or topics considered essential in terms of the subject being evaluated, subject matter specialists will also assess how the Australian Curriculum for this learning area compares with the curriculum of two other relevant countries, focusing on their approach to the inclusion and design of key learning content, core knowledge and accompanying rationales (the four to five key content areas etc. and the countries to be chosen will be determined following consultation between the subject matter specialist and the Reviewers and documentation will be provided).

Finland Background

The Finnish senior chemistry course is a 3 year course that includes a core subject that all students are required to complete, and then the rest of the chemistry is delivered as four elective studies which the students select. Students are required to complete ten electives across all learning areas.

The compulsory core course contains:

- organic chemistry in reference to the bonds, polarity, compounds. Properties and applications
- mixtures, amounts of substances and proportions
- redox and acid/base reactions.

The specialisation course (electives)

1. microworld
2. reactions and energy
3. metals and materials
4. reactions and equilibrium.

The content covered is rather traditional and has not included much of the new sections of the Australian course. As the specialist courses in Finland are independent elective units, these units with their specific themes cannot have overlapping links in the curricula. Both the Finnish and the Australian curricula focus on knowledge and skills. The Finnish units contain more traditional knowledge, which is where the curriculum is broken up into three areas of chemistry, physical, inorganic and organic chemistry, resulting in the topics having far more depth in each topic but less breadth. However, chemistry as a subject has moved on over the years and there are other areas of chemistry to study, such as analytical and spectroscopic chemistry. The current Victorian chemistry curriculum covers these areas well, however, this new Australian chemistry curricula is somewhat in between the Finnish more traditional curricula and the current Victorian chemistry curricula which contains more modern areas of study. Being in the middle of these two results in the lack of rigour in the Australian Curriculum: Chemistry. This was raised in the discussion of the Units 2 and 3 as a major issue.

The more depth of the topics ensures that the Finnish have a greater understanding of particular courses selected and this may also impact on the teaching style.

The Finnish curriculum has quite similar capabilities (literacy, numeracy, ICT, local issues etc.) compared to the Australian curricula and a number of cross-curriculum priorities with their own individual focus.

Singapore Background

The aims of the Singapore chemistry curriculum cover content, understanding, experimental work and the development of skills. These aims are essentially the same the Australian chemistry curriculum. The senior chemistry course is a 2 or 3 year course for chemistry, where students enter with an assumed level of knowledge and understanding of chemistry at O level or as a part of a balanced science course.

The Singapore curriculum is designed to place less emphasis on factual material and greater emphasis on the understanding and application of scientific concepts and principles. This is so students develop skills that will be of long term value. The experimental work is a valued component and underpins the teaching and learning.

The content covers:

1. atom, molecules and stoichiometry
2. atomic structure
3. chemical bonding
4. gases

5. chemical Energies
6. electrochemistry
7. equilibria
8. reaction kinetics
9. inorganic chemistry
10. the periodic table
11. organic chemistry.

In reviewing the contents within each unit above, the units are seen to be again very traditional like the Finnish curricula, i.e. focusing on three areas of chemistry, physical, inorganic and organic chemistry. These units have far greater depth and detail compared to the Australian Curriculum, noting that this traditional content is lacking the analytical and spectroscopy content which is vital in a modern chemistry course. There are also a few less units (redox and electrochemistry) in the Singapore curriculum, so the time saved in not doing these units would be easily used to in developing the other units in far greater depth.

The Singapore assessment is also rather demanding with 3 exams and a school based practical, this is much more than the Australian Curriculum.

Like the Finnish and Australian curricula, the Singapore curriculum has clear capabilities and cross-curriculum priorities which are embedded into the teaching of the chemistry units if the students undertake the units.

Australian Curriculum: Earth and Environmental Science Review

Undertaken by Kathryn Grainger

Section A

Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. The content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- *Robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*
- *Balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)*
- *Scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.*

This course cannot really be evaluated against the existing environmental science course offered in the VCE as it is vastly different through the inclusion of geoscience. It cannot be evaluated against the chosen benchmark countries of Finland or Singapore as neither offer a 'stand alone' environmental or geoscience study in senior secondary. Therefore some general comments relating to the scoping brief will be made to the best of this author's ability, after seeking opinion from current environmental science teachers, geoscience university experts and drawing on personal experience from teaching geoscience as an elective subject.

The inclusion of Earth Science into the existing Environmental Science VCE subject has introduced many new concepts to the old study and offers a more rigorous, independent study that has less overlap (similarity), to parts of the existing VCE Biology course. The inclusion of Earth also offers a pathway for students interested in geology and geoscience to pursue their passion into senior secondary schooling, an opportunity that had previously not existed.

A major change in focus of the course is the emphasis on multi-disciplinary teams across all the sciences to use models, collect evidence, interpret meaning and generally use science specific inquiry skills to understand and explain Earth's structures, systems and our interactions with those. Without the Earth and space science support in Years 7 to 10 general science, this would be a vast inclusion into the existing course and probably too demanding. However, Years 7 to 10 now has Earth and space science as one of the core areas of science and will offer appropriate scaffolding and background to underpin this advanced study in Units 1-4.

The interrelated, key features of Earth's 4.5 billion year history underpins the Earth and environmental science study across all three strands of Understanding, Human Endeavour and Skills. The inclusion of Earth into the study has improved the academic rigour of the subject and positioned it squarely as a science, (many schools have housed environmental science in their humanities faculty). Universities also struggle with 'categorising' some of the newer studies into their established faculties of learning, (e.g. climate science may be in mathematics due to the heavy mathematical modelling required or physical geography or geology). The age of Earth issue can be neither escaped nor 'side-stepped' in this study. This is an important inclusion as there is a fundamental requirement to accept, with scientific evidence, the age of Earth as 4.5 billion years and the age of the Universe as 13.8 billion years. The multi-disciplinary approach is evident when the content descriptions are reviewed as outlined in Table X below:

Table 6.7: Comparative table of content descriptions – Earth and Environmental Science

Topic	Unit 1	Unit 2	Unit 3	Unit 4
Geoscience (classic geology and physical geography)	Principle of Uniformitarianism. Geologic time scale. Earth's structure. Earth's temperature differentiated atmospheric layers. Fossils. Sedimentology. Hydrothermal activity.	Tectonic plates. Ocean currents. El Nino and La Nina	Renewable and non-renewable resources over geologic time. Australia's mineral resources; gold, fossil fuels, iron ore etc. Method of mineral extraction. Ecological footprint to quantify effect of producing, harvesting, transporting and processing of	Earth hazards. Plate tectonics generating earthquakes, volcanic eruptions and tsunamis. Major weather systems. Global climate change at a variety of time scales. Geological, historical and prehistorical records as evidence of climate change effect.

Topic	Unit 1	Unit 2	Unit 3	Unit 4
			resources.	
Physics	Radioisotopes and radiometric dating. Meteorites and space.	Conservation of energy. Energy transformations. Heating and cooling. Greenhouse effect.	Renewable energy technologies.	Monitoring and analysis of ground data.
Chemistry	Isotopes. Atmosphere and volcanic eruption composition Properties of water.	Atmospheric gases.	Water.	CO ₂ , CH ₄ , NO and hydrofluorocarbon atmospheric effect.
Biology	Soil biotic processes. Photosynthesis. Interaction of the Earth's spheres to give rise to diverse communities. Living organisms over time.	Evaporation and photosynthesis. Energy and matter to support an ecosystem. Biogeochemical cycling of matter	Renewable resources from ecosystems. Human activities that affect ecosystems. Water. Population viability and overharvesting.	Impact of natural hazards on ecosystems.

Sequencing and scope is well developed, there are no obvious inclusions or deletions required from the course. It is balanced, rigorous and quite different from any other environmental science course seen by this reviewer.

The general capabilities are sound in their application to Earth and environmental science. The cross-curriculum priority of sustainability is particularly pertinent; links to Asia and Aboriginal culture are much more tenuous. There are links with traditional land management practices by Indigenous communities and tectonic plate boundaries around Asia; however it is still a feeble link that could be explored by the teacher and students if desired. There is little detail regarding the reporting of cross-curriculum priorities or the general capabilities in the senior schooling curriculum documentation, rather there is a general reference in the introductory notes. It is therefore difficult to comment on the soundness when their degree of inclusion is unspecified.

There is a high degree of flexibility in the documentation and the course should be challenging to teach and exciting to study. One issue will be the availability of an appropriate text for the students and teachers to use. The documentation sets out the achievement standards clearly and it is expected that more detail about assessment and reporting will be presented as the implementation

nears. The standards and areas of study are very clear for students, teachers and parents alike. This document is very accessible to all stake holders.

Section B

Subject matter specialists will provide an analysis and evaluation of how the Australian Curriculum for Earth and Environmental Science compares with Finland and Singapore.

Singapore does not offer this course in senior studies, nor does Finland. There are aspects of the course in the Finnish science curriculum for senior geography where a compulsory senior study of The Blue Planet explores the structures of the atmosphere, winds, weather and climate and the functioning of Earth as a planet within a solar system, galaxy and universe. A specialisation course within geography deals with 'A world of hazards', a topic studied in the Australian Curriculum in Unit 4. The fundamental difference between the treatment of these topics in Finnish and Australian curricula is that the Australian study is dedicated, strongly anchored in science and seemingly very robust.

In summary, this is an impressive, robust, interdisciplinary course that offers a genuine alternative to the traditional sciences on offer to senior students in Australia.

Australian Curriculum: Senior Biology Review

Undertaken by Mark McTier

Section A

Subject matter specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:

1. The content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:

- a) Robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)*

Firstly, the content descriptions placed under the headings of the three strands; Science Inquiry Skills, Science as a Human Endeavour and Science Understanding is a very good idea and clearly sets the context for each of the topics.

It is evident that there is a lot of sophistication with the connections created between the various strands, achievement standards, dimensions and performance levels, however, this could possibly be confusing to parents and students. Perhaps a diagram or hierarchical chart could be provided to show the interrelationships between these structures of the curriculum.

The biology course rigour is very good and covers all essential elements I would expect to see in the two-year biology course. One topic, typically in Unit 1 or 2, that is not included is reproductive biology. This topic has many benefits, including enabling students a deeper of the understanding of adaptations, mate selection and an understanding of r and K selection theory with particular reference to specific animal classifications, such as mammals, fish and reptiles.

The structure and sequence of the course looks suitable and cohesive in most cases. There is generally a good flow in the biology concepts from the junior secondary biology components and senior secondary concepts. One exception is the concept of homeostasis:

‘Homeostasis involves a stimulus-response model in which change in external or internal environmental conditions is detected and appropriate responses occur via negative feedback; in vertebrates, receptors and effectors are linked via a control centre by nervous and/or hormonal pathways (ACSBL110)’ and ‘Changes in an organism’s metabolic activity, in addition to structural features and changes in physiological processes and behaviour, enable the organism to maintain its internal environment within tolerance limits (ACSBL111)’.

These two descriptions should be in Unit 2 Biology, rather than in Unit 4 Biology. This focus on the negative feedback systems and the maintenance of the internal environment within narrow limits would be a good bridge between the two years of biology and a building on student of knowledge on the topic of homeostasis from similar topics studied at Year 9.

The content descriptions are generally clear and succinct, in particular the Science Understanding strand across the 2 years. However, the Science as Human Endeavour strand generally requires more detail. I understand that having some autonomy as teachers is desirable, however, when more detail is provided, then there is often less confusion amongst teachers, students and parents. Secondly, if more detail is provided then biology teachers will tend to incorporate those concepts better with the Science Understanding, which, unless provided with sufficient detail, would usually tend to have a lower priority. I have included some specific examples below from various strands, including Science Understanding across the four units that I suggest need more elaboration.

(ACSBL015) ‘Biodiversity includes the diversity of species and ecosystems; measures of biodiversity rely on classification and are used to make comparisons across spatial and temporal scales’ – Are these spatial and temporal scales very large/long, such as global and over millions of years, or quite short/small such as generations?

(ACSBL017) ‘Biological classification systems reflect evolutionary relatedness between groups of organisms’ – Does this include the teaching of phylogenetic trees, genetic, amino acid or protein comparisons?

(ACSBL038) ‘Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines’ – Providing at least one example for many of the Science as Human Endeavour strands would give clarity around these statements.

(ACSBL003) ‘Conduct investigations, including using ecosystem surveying techniques, safely, competently and methodically for the collection of valid and reliable data’ – A reference to understanding the benefits of using modern technology (such as data-loggers or satellite data) would possibly assist with this description. This would also make the link between this description and the related description in Unit 3 biology (ACSBL068).

(ACSBL042) ‘Scientific knowledge can enable scientists to offer reliable explanations and make reliable predictions’ and (ACSBL069) ‘Models and theories are contested and refined or replaced

when new evidence challenges them, or when a new model or theory has greater explanatory power’ – Specific examples for these and other descriptions would be particularly helpful, especially if they were related to the Science Understanding or Science as Human Endeavour strands. The reason being, that I imagine there will be an end of year exam, and specific example would clarify how these particular topics would be assessed.

(ACSBL073) ‘International collaboration is often required when investing in large-scale science projects or addressing issues for the Asia-Pacific region’ – examples of this would be good, perhaps the Eliminate Dengue Program, which relates to international and local Australian issues and current research².

(ACSBL085) ‘Frequencies of genotypes and phenotypes of offspring can be predicted using probability models, including Punnett squares, and by taking into consideration patterns of inheritance, including the effects of dominant, autosomal and sex-linked alleles and multiple alleles, and polygenic inheritance.’ – does this include hybrid genetic crosses as well as monohybrid crosses? What about Hardy-Weinberg principle/calculations, are these included?

(ACSBL086) ‘DNA sequencing enables mapping of species genomes; DNA profiling identifies the unique genetic makeup of individuals’ – does this include calculating map units of distances between genes?

(ACSBL117) ‘Pathogens include prions, viruses, bacteria, fungi, protists and parasites’ – are life cycles of the various pathogens expected? If so, this should be included in the description.

The Science Inquiry Skills and Science as a Human Endeavour strands provide sufficient opportunities for students to learn about values, ethics and principles. To be done effectively, these strands should be authentically taught alongside the Science Understanding strand.

b) Balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis)

In general, there is a balance of knowledge areas, concepts and themes, including biodiversity, classification, species relationships and interactions, environments and ecosystems, cells, biochemical processes, body tissues and systems (human and non-human), DNA, genetics and protein synthesis, genetic mutations, biotechnology, evolution and natural selection, population genetics, homeostasis, cell signalling, infectious disease and the immune response.

² The Eliminate Dengue research program is a not-for-profit international collaboration led by Professor Scott O’Neill that brings together [scientific collaborators](#) from around the world with a range of skills and experience including; *Wolbachia* genetics, mosquito biology and ecology, dengue epidemiology and control, and health education and promotion. In each country project site the program team works collaboratively with local research institutes, governments, regulatory authorities, private enterprise and community members.

c) Scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.

There appears to be sufficient scope for choice and flexibility in curriculum delivery. One concern is that the Unit 3 biology course looks quite full and the potential impact will be that this will restrict creativity and flexibility in curriculum delivery. One way to reduce this pressure is to move a small section of the homeostasis topic to Unit 2 biology.

2. The soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to curriculum content in this learning area.

In general, there are few strong links between the general capabilities and biology content, however, in the cases where there are links; examples should be provided to clearly show the connection and possible depth of exploration for students and teachers. For instance, the only occasion where intercultural understanding is closely linked to biology (Science Understanding) is:

(ACSBLO16) 'Biological classification is hierarchical and based on different levels of similarity of physical features, methods of reproduction and molecular sequences'

As such, the connections between intercultural understanding and biology are few and far between and quite arbitrary. A similar thing can be said for ethical understanding. The impact of this is that teachers are unlikely to teach these general capabilities with conviction or to any reasonable depth. If there are more connections, then there would be enormous benefits if examples of ethical understanding and Intercultural understanding were provided for teachers, otherwise these general capabilities should be removed from the senior biology component of the Australian Curriculum.

3. The appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across this learning area, and whether there are alternative approaches which could have been developed to introduce these themes.

I do not think it is very clear as to the appropriateness and relevance of the three cross-curriculum priorities:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability.

They do not seem to be well integrated at all well into the Science Understanding strand. The examples provided in the description on page 15 of the curriculum documents are very good and are a good resource for teachers and students. However, if these concepts are to be taught, I would suggest that the examples are provided in the relevant sections of the content descriptions. Lastly, it appears that the cross-curriculum priorities are mostly relevant to Units 1 and 2 biology, as these are the example provided and do not seem to easily fit in with the Unit 3 and 4 biology content descriptions.

4. The extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.

There appears to be sufficient flexibility in the way the biology content and concepts could be taught in Australian classrooms in different school contexts, such as distance education, specialist schools, schools with varying ICT capabilities and with diverse cultural backgrounds. In general, this is probably more relevant, due to more flexibility of the course in Unit 1 and 2 biology, where the learning can be more contextual to the school's unique location, diversity of students and available local resources.

5. Any significant treatment in the Australian Curriculum documents for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.

A variety of assessment should be allowed to be chosen by the school. In relation to assessment, the VCE system is quite good, with students conducting many experiments throughout their 2 years of Biology, several of which, chosen by the school by following guidelines, are used as assessment. The variety of assessment could include exams, tests, practical experiment and reports, data analysis tasks, research investigations and oral presentations.

The characteristics of pedagogy and epistemology should be evidence-based and high quality, but left to the school and individual teachers to organise for themselves, allowing the teachers freedom to employ their craft as educators.

6. Whether the curriculum documentation in this learning area is friendly for students, teachers, and parents, and for development of accountability and reporting measures which will lead to effective school community engagement.

The documentation is generally accessible to students, teachers and parents, however, more detail, including key words, is needed for most descriptors, particularly for the Science Understanding strands. For example:

Example 1. Continuity of life requires the replication of genetic material and its transfer to the next generation through processes including binary fission, mitosis, meiosis and fertilisation (ACSBL075). Each one of these concepts (e.g. Binary fission, mitosis, meiosis and fertilisation) are all very large topics in themselves. Clarifying points such as inputs and outputs of the processes, are we only studying the nuclear material or the other cellular structure also?

Example 2. Proteins, including enzymes, are essential to cell structure and functioning (ACSBL080). This topic can also be very large. Important considerations of clarity include, do we need to understand: rates of enzyme-controlled reactions, enzyme inhibition, induced fit versus lock and key hypothesis, activation energy, cofactors and co-enzymes?

This has an impact on accountability and reporting for schools. If insufficient detail is provided, then there is confusion over the depth of understanding required, particularly by students and teachers. This point cannot be over-emphasised enough.

7. Whether the curriculum for this learning area encourages a love of learning, a joy of discovery, and a quest for knowledge and related skills.

This curriculum will allow for students to continue developing a passion for learning biology. In my experience, students develop a joy of discovery and love of learning biology when it is presented in

an interesting and innovative way. For example, in cutting edge areas of biology, such as biotechnology, students have a real thirst for knowledge in these areas.

Section B:

Curriculum Comparison - Using four or five key content areas, skills, and/or topics considered essential in terms of the subject being evaluated, subject matter specialists will also assess how the Australian Curriculum for this learning area compares with the curriculum of two other relevant countries, focusing on their approach to the inclusion and design of key learning content, core knowledge and accompanying rationales (the four to five key content areas etc. and the countries to be chosen will be determined following consultation between the subject matter specialist and the Reviewers and documentation will be provided).

Finland's Biology Course: Discussion Points

Finland's biology courses are vastly different to the proposed Australian Curriculum and current VCE biology curriculum. Finland has a core biology component and 'Specialisation Courses', of which there are three, Environmental, Human Biology and Biotechnology. The core component is a basic Biology course that is most similar to an equivalent Unit 1 and 2 biology in the Australian Curriculum or VCE Biology level. The specialisation courses are aimed at a mix of levels, covering very similar content to Unit 1 to Unit 4 biology. I think the system that Australian Curriculum proposes is the preferred model. There are, however, benefits to running a course that includes 'specialisation courses', such as it allows for student choice, can improve motivation and interest in learning. However the disadvantages are in the logistics of schools teaching courses that have such variety, including the coordination of students' preferences for such electives can be difficult for schools to organise.

Singapore's Biology Course: Discussion Points

Singapore's biology course is very similar to the Australian Curriculum and the VCE, in relation to topics; however, there is one significant difference. Singapore's biology course provides far more detail in the descriptors for each topic. It is far more preferable to have a more detailed set of curriculum descriptors. The benefits are that teachers, students and parents are fully aware of what is expected for any particular topic. There are elaborations, detailed explanations and examples provided in the Singapore documentation, all beneficial and preferable to the Australian Curriculum descriptors. Refer to the table below for a comparison of the topic of Mitosis (an example that is common to both Singapore and Australian Curriculum), demonstrating the elaborations provided by the Singapore curriculum:

Australian Curriculum	Singapore Curriculum
Continuity of life requires the replication of genetic material and its transfer to the next generation through processes including binary fission, mitosis, meiosis and fertilisation (ACSBL075).	<p>(l) Explain the importance of mitosis in growth, repair and asexual reproduction.</p> <p>(m) Explain the need for the production of genetically identical cells and fine control of replication.</p> <p>(n) Explain how uncontrolled cell division can result in cancer, and identify causative factors (e.g. genetic, chemical carcinogens, radiation, loss of immunity) which can increase the chances of cancerous growth. (Knowledge that dysregulation of checkpoints of</p>

Australian Curriculum	Singapore Curriculum
	<p>cell division can result in uncontrolled cell division and cancer is required, but detail of the mechanism is not required.)</p> <p>(o) Describe with the aid of diagrams, the behaviour of chromosomes during the mitotic cell cycle and the associated behaviour of the nuclear envelope, cell membrane and centrioles. (Names of the main stages are expected)</p> <p>(p) Explain what is meant by homologous pairs of chromosomes</p>

7. History (Foundation to Year 12) – Professor Gregory Melleuish

Executive Summary

The conclusions of this review can be found at the end of this review. I would emphasise the following:

- A history curriculum based on teaching Australian history within a world history framework is the most appropriate history to be taught to Australian students in a twenty first century globalised world. This is because it will enable students to understand their own national history within the framework of the development of humanity over the past ten thousand years, thereby enhancing their capacities as citizens of an Australia which is a member of an international community. It will also help develop the skills needed to understand that world.
- As I discuss in the review, there are problems with a curriculum understood as one which combines Australian history and world history. The curriculum is not robust in world history because it lacks many of the things one would expect to find in a world historical approach. It lacks balance for exactly this reason; it is often too Eurocentric in its historical understanding while at the same time not really giving enough importance to the place of Western civilisation in world history, especially over the past two hundred years. There are also some significant imbalances which seem to be ideologically motivated, in particular the exclusion of liberalism as an important progressive doctrine of the nineteenth century. In this regard it fails to prepare students to be good citizens of twenty first century Australia. Primarily this is because the emphasis on depth studies as opposed to the overviews means that students will end up with a view of the past which is fragmented. They will fail to appreciate the journey which humanity has travelled over the past ten thousand years, which is surely the primary reason for adopting a world history approach. The lack of an overall vision, such is found in different ways in both the English and Singaporean curricula, and an incoherence with regard to the content to be taught, means that the students will not benefit from the study of history as they should. Regarding more specific historical skills, this is difficult to evaluate as they are expressed in very general terms, and, unlike the Singaporean curriculum, not linked specifically to the content. The curriculum favours an approach which focuses on the study of a number of limited topics which are connected at the expense of the overarching narrative. The problem is that the parts are often difficult to understand without some appreciation of the whole. Depth studies are a good idea but cannot constitute 90 per cent of the curriculum.
- The curriculum needs to be restructured if it is to fulfil its goal of studying history, including Australian history, through the lens of world history.
- There needs to be more conceptual rigour in the design of the curriculum so that students are able to appreciate using a global approach to how human beings in the past lived. Students need to be taught about their 'significant past'.
- The cross-curriculum priorities are a hindrance to the educational goals of a first quality history curriculum and should be abolished.

- More time needs to be allocated to the overview in each year so that students are provided with a coherent narrative of the past.
- Depth studies should be retained but their specific content not be mandated. Schools and teachers should be given the opportunity to go into depth on those topics which they believe are relevant for their students. The curriculum should provide suggestions only.
- The curriculum should be less prescriptive and much less bureaucratic. The English curriculum provides a model in this regard.
- The primary curriculum is far too Australcentric and should be amended to include non-Australian material
- More attention needs to be paid to the quality of the textbooks to ensure factual accuracy.

Introduction

The Australian history curriculum is compulsory for Years Foundation through to Year 10. It states that its rationale is as follows: ‘The curriculum generally takes a world history approach within which the history of Australia is taught.’ The curriculum is also defined, and limited, by its three cross-curriculum priorities:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia’s engagement with Asia
- Sustainability.

As I am a professional academic historian my major concern shall be with the content of the curriculum and with the issue of the extent to which the current curriculum can be said to be balanced and in line with current historical practice, especially with regard to taking a ‘world historical approach’ within which the history of Australia is taught. I shall focus more on the secondary school section of the curriculum as I believe that it is in this section that my expertise as someone who has taught ancient Greek, ancient Roman, modern European and World history, and who has published in Australian and World history, is best deployed.

The structure for the report will be as follows. I shall first consider the rationale for the study of history and the issue of deciding what should be included in the curriculum. I shall then consider briefly the primary curriculum followed by a fuller consideration of the secondary curriculum. The review will be rounded off with a comparison of the Australian history curriculum with those of Singapore and England.

The rationale for the study of history

There needs to be a clear rationale for teaching history to students and for making such study compulsory. This rationale has two aspects to it. The first relates to the sorts of knowledge one wishes students to acquire as a consequence of their study of history. The second relates to the sorts of skills and capacities which the student will hopefully acquire through the study of history. While the latter is relatively unproblematic, the former can be highly controversial. It will always be possible to find more and more things to put in a history curriculum, almost to an infinite degree. Since the History Summit in 2006 there has been a constant refrain from history teachers that any

proposed curriculum contains more material than can be taught. The hardest curriculum question is not what to put in, but what to leave out.

One solution to the issue of content is to say, as some do, that the content does not really matter as what is crucial are the skills. Any content will do. Such an approach is unsatisfactory; some of the skills inculcated by history involve an appreciation of change over time, and a capacity to relate the study of fairly limited topics in terms of both period and place to wider historical developments. A crucial historical skill is the capacity to employ analogy and this requires a good knowledge base. Skills, on the whole have to be grounded in particular subjects or disciplines.

The history curriculum argues that its central feature is that it places Australian history within the framework of world history. This expands the amount of potential material which can be included in the curriculum considerably while the time available is limited; it also means that there needs to be a very good reason for including particular historical periods, geographical areas and themes for study.

There also needs to be a linking together of the various areas of study over time so that connections can be made amongst them. This is what is generally understood as a narrative. Hence in the study of Roman history it is crucial to understand that the republic precedes the Principate and that to understand the latter it is necessary to have some knowledge of the former.

How then is one then to create a history curriculum for twenty first century Australian school students which is able to provide students with a sense of change over time, allows for the consideration of certain topics in detail and can manage the potentially huge amount of material which could be studied? This is not an easy task and it must be said that the existing curriculum does not perform this task very well. There is a lack of overall coherence and it would be possible for a student to complete Year 10 history with a very fragmentary knowledge of the human past. For example a student could study the following list of depth studies from Years 7 to 10: Investigating the ancient past, Egypt, ancient India, The Ottoman Empire, Japan under the Shoguns, The Spanish Conquest of the Americas, Movement of peoples (1750-1901), Asia and the world, World War I, World War II, Rights and freedoms, Popular culture.

There does not appear to be a philosophy or vision underpinning the curriculum and its overall intention. Instead there are a number of structural imperatives, the chief of which are the three cross-curriculum priorities. Of course there needs to be appropriate attention given to both Indigenous history and the study of Asia in the curriculum but it is difficult to see how the topic of sustainability relates to the historical endeavour. Unfortunately the inclusion of these priorities has distorted the structure of the curriculum because too often the curriculum has been framed with them in mind rather than addressing the pedagogical issue of what constitutes an appropriate curriculum for Australian students. This can be seen in various attempts to include Asian topics in the depth studies, such as in the Year 9 depth study where students study either nineteenth century Australia or Asia, and in the inclusion of a depth study on the environmental movement.

Another major problem is the nature of the depth studies themselves. The depth studies constitute 90 per cent of the curriculum in from Year 7 to Year 10. In some depth studies there is no choice,

such as the unit on World War I in Year 9, but in other depth studies there is a choice of three electives. Hence in one of the Year 7 depth studies students are given the choice of studying Ancient Greece or Ancient Rome or Ancient Egypt. There are good reasons for Australian students knowing something about both Greece and Rome as they have provided the basis for so many aspects of our contemporary world including politics, law, literature, art, religion. There are some topics which should be taught to all students, such as Greece and Rome, both of which are mandated in the English curriculum.

In fact, the whole structure of the curriculum with 10 per cent of any year being devoted to what is termed the overview and 90 per cent to depth studies is highly problematic. It would be extremely difficult to give an adequate overview for any of Years 7, 8, 9 and 10 in such a limited amount of time. In effect, what students will bring away with them from the study of history will be what they learn in their depth studies. This could mean, for example for an individual student, ancient Egypt, ancient India, the Ottoman Empire, Polynesian expansion, the Black Death, movements of peoples in the nineteenth century, Asia and the world in the nineteenth century, and popular culture. It is difficult to know what students would acquire out of the study of such a collection of topics, unless, of course, one adopts the position that the content of history does not matter, only the acquisition of skills. There certainly is no coherence to such a collection of studies; students would not acquire an adequate understanding of the origins of their own society and culture, let alone adequate knowledge and understanding of Australian society and culture.

This concern is borne out through an examination of what these truncated overviews mean in practice. In the chapter devoted to the overview in the Pearson Year 8 textbook derived, as the heading indicates, 'Straight from the Australian Curriculum, Assessment and Reporting Authority', the overview consists of little more than a collage of the various depth studies. This leads to some bizarre history including the statement 'After the fall of Rome in 476 AD, Europe moved into a period when little changed and the feudal system was dominant'. This is the contemporary equivalent of *1066 and All That: A Memorable History of England*¹, and is basically nonsense. Our students deserve better.

The use of the term 'Middle Ages' in a textbook servicing a curriculum purporting to be world history hearkens back to a Eurocentric view of history circa 1950. The focus on the Ottoman Empire leads to a garbled account of the history of Islam. The idea that the Crusades were the first time that the expansion of Islam was slowed down, as found in the Pearson textbook, is simply false, as the defeat of the Muslims before the walls of Constantinople in 717 indicates.

The point is that the mandated depth studies will not lead to students possessing a well-rounded twenty first century knowledge of history based on up to date scholarship, but a fragmented and sometimes false view of the past. Unfortunately, the level of scholarship found in the textbook cited above is closer to 1950 than 2014.

There are sound pedagogical reasons for encouraging students to study some topics in depth. It allows them to get to grips with particular aspects of the past and to deal with problems of historical

¹ The book is a parody of the style of history teaching in English schools at the time. It purports to contain "all the History you can remember".

interpretation. However, it is extreme when most of the curriculum is taken up with depth studies with very little time being left to construct some sort of linking narrative. I discuss what the general approach I believe should be adopted later in the review but generally I would advocate a narrative which helps students to understand how the life of human beings has changed over the past ten thousand years. The English National History curriculum also mandates depth studies but does not prescribe what those depth studies should be. It provides suggestions to help guide schools and teachers.

My view is that the number of depth studies should be reduced. Many of the more important ones should become compulsory (as some are already). This would mean that more attention would be given to creating a more structured historical narrative thereby ensuring that students receive a much more coherent account of the past so that it becomes more than just a collection of things (which may or may not be true) which they ‘know’ about the past. As discussed later it would be better if the depth studies were left to the discretion of the teachers. I give an indication of what depth studies should be removed later in the review but generally I would remove those which do not help students understand Australia, its place in world history and the crucial elements of the history of humanity over the past ten thousand years.

Having participated in Australian Curriculum, Assessment and Reporting Authority (ACARA) sessions evaluating the curriculum in 2010, my feeling is that the heavy emphasis on the depth studies reflects the interests of teachers rather than a concern for the needs of the students. It also reflects a view amongst teachers, which they have inculcated from their academic teachers, that the task in which they are engaged is one of training historians rather than providing students with a working knowledge of the past which will benefit them in their callings in the wider world. It all comes back to the issue of skills and content. If history is just about skills and content is only of secondary importance then it can also be argued that there are a number of disciplines which could be substituted for history and which deliver the same skills to students. If such is the case then the rationale behind having students study history becomes highly problematic.

This comes back to a central issue: why is history a central pillar of the curriculum and what do we expect students to acquire through its study? My assumption is that content is central to studying history and that there is a purpose to the ‘history’ which students study.

We need to discover a principle that allows us to create priorities as to what should be in a history curriculum. This is the principle of the ‘significant past’.² The ‘significant past’ can be considered to be those aspects of history which are of importance or significance for a country when considering such issues as curricula, or research funding or what should be emphasised in museums. Obviously the history of Australia, including Indigenous history, is central for any student studying history in Australia but deciding what else should go into the mix from the rest of the world is not easy. The Australian history elements of the curriculum should focus on key political, social, economic and cultural developments. It is really a matter of establishing priorities. Given the limitations of teaching time this is not an easy task.

² Greg Melleuish, *Is the West special? World History and Western Civilisation*, Melbourne, 2012, page 13

What is the significant past beyond Australia for Australian students studying history in the twenty first century? Given obvious restraints, there needs to be clear appreciation of what is essential for any student to know about the history of human beings over the past sixty thousand years. We need to think in terms of the sorts of knowledge which students will take with them into the wider world when they have finished their schooling.

A good starting point would be the human achievement over the past sixty thousand years and the circumstances under which those achievements occurred, with a particular emphasis on those civilisations and societies which may be said to be our ancestors in terms of our culture and institutions, as a western liberal democracy. This should be supplemented by the study of significant others, those civilisations and societies which have a particular relevance for young Australians. In particular, there is a strong argument that Australians should have a good understanding of China.

One real problem with the curriculum is that it purports to be ‘world history’ but no practising world historian, including myself, would regard it as such. It has aspirations to place Australian history in a world historical framework but, for a variety of reasons, it does not deliver in this regard. It demonstrates very little appreciation of what a genuinely globally focused history means and, as discussed above, remains very Eurocentric in its outlook. Nevertheless the aspiration of having world history as the basis of the curriculum is in line with best contemporary practice in the study of history. As Jürgen Osterhammel puts it in his recent global history of the nineteenth century, ‘All history inclines toward being world history.’³

World history is built around a number of themes including the growth of contacts between the various peoples of the earth (for example the work of Jerry Bentley), the importance of environmental factors for understanding history and the comparative study of the world’s civilisations. It has generally sought to de-centre our understanding of history by emphasising the role of non-European and non-Western societies and civilisations. This approach is healthy so long as it does not lead to ‘Europe bashing’ and attempts to denigrate the history of Western countries. Nevertheless, the fact remains that the biggest story in history over the past three hundred years has been the ‘rise of the West’ and its consequences. Understanding the West remains central to any historical appreciation of our contemporary circumstances. However, even the ‘rise of the West’ needs to be embedded in its world historical context. There needs to be balance struck between the history of humanity and the history of the West which forms the basis of contemporary Australia.

There are many ways in which a more world historical approach could be embedded in the curriculum. One way would be emphasise general historical developments which provide students with a general sense of how human existence has changed over time. This should include such matters as the warming of the earth after the last ice age and the effects of natural climate change generally, the growth of agriculture and pastoralism, the domestication of plants and animals, the development of religion, art and philosophy, issues related to disease and mortality and human conflict (war), followed by the development of civilisations, and the subsequent development of human productive capacities. In this way students would then be able to appreciate more fully the

³ Jürgen Osterhammel, *The Transformation of the World: A Global History of the Nineteenth Century*, Trans. Patrick Camiller, Princeton, 2014, 3

way in which the industrial revolution transformed the world in the nineteenth century and how very different the lives of people living in the past were. At the same time the curriculum needs to include a focus on human agency and the importance of individuals.

If the goal of the curriculum is defined as providing a coherent narrative about the significant past of Australian students in the twenty first century then the current structure of the curriculum must raise concern. The structure mirrors the Eurocentric ancient-medieval-modern model of history which is inappropriate for the study of any civilisation outside of the West. At the same time, it is not clear why the period from 60,000 BC to 650 AD should be termed the Ancient World, or why the next period is defined as stretching from 650 to 1750. Dividing history up into periods is a tricky exercise and open to challenge. The easiest and simplest means of achieving a simple periodisation would be to use a simple pre-modern/modern divide using the Industrial Revolution and the rise of the West as the dividing line.

History Curriculum Years 1–6

What strikes one looking at this part of the curriculum is the following:

- It focuses almost exclusively on Australia. Given previous experience with the teaching of Australian history in Years 9 and 10 in New South Wales one has to ask what the effect of an exclusive diet of Australian history will be. It should be noted that neither England nor Singapore concentrate exclusively on their own country at primary school level.
- The curriculum is very earnest and seems to be concerned with developing quite sophisticated historical concepts in relatively young children.
- There is conspicuous lack of individual people and stories in the curriculum which is quite abstract in its approach. It is more concerned with abstract concepts such as commemoration, identity and community rather than real people and what they did. Not a single person is mentioned in the curriculum (as opposed to the Year 7 to 10 curriculum). It is worth noting, in this regard that the English National History curriculum for primary school specifies that students study a number of individuals.

The major concern with the Year 1 to Year 6 curriculum is, as stated above, that it is too focused on a number of issues considered important by professional historians and not concerned enough with developing young minds with an appreciation and love of history. My belief is that its concerns are too abstract and do not engage enough with the fact that history is about real people. A focus on such individuals aids the development of the historical imagination.

The exclusive concentration on Australia is worrying. One wonders if non-Australian material could be included in the curriculum, especially stories about individuals who led interesting lives. Biography is a great strength of historical work in the English speaking world, and a more biographical approach will stimulate younger students to appreciate historical study.

Generally I would advocate much greater use of a biographical and story based approach to the study of history during these years, even if the approach remains exclusively Australian. There is a wealth of interesting Australians from a range of backgrounds, both male and female. Choice could be left to individual schools and teachers. There is some indication that significant individuals will be

studied, as in Year 4 and the study of a particular explorer, the study of a particular ‘individual or group’ in Year 5. But groups are emphasised much more than individual people are.

My fear is that the curriculum, as described for these years, is too concerned with inculcating a set of abstract notions related in particular to identity, than with allowing young minds to engage with the living reality of the past. For these young students a focus on significant actors in the past is much more likely to achieve this goal.

The Secondary Curriculum

In the context of the Australian national curriculum it would make the most sense to break the curriculum up into two sections the pre-modern and the modern, with the modern being defined as the period characterised by industrialisation, modern science and the expansion of Europe in the late eighteenth and early nineteenth centuries. Years 7 and 8 can be considered to be dealing with the pre-modern world with Years 9 and 10 concerned with the modern world.

Using this simple structure the issue becomes one of how to teach students in Year 7 and Year 8 about a world which is very different from their own and from a world historical perspective. The existing overviews are inadequate in providing a framework. There are a number of features of the human world as it emerged from the global warming which followed the end of the last ice age. The central ones are listed below. They set the framework for understanding how the human race has developed over the past ten thousand years and how people who once made a living out of foraging and hunting now live in high tech industrial society:

- Roughly speaking humanity fell into three major groups: agriculturalists, pastoralists and foragers. These three groups developed in the wake of the warming of the earth about 10,000 to 12,000 years ago. By the nineteenth century agriculturalists were dominant with the restriction of foragers to marginal land and the destruction of the last pastoralist empire, that of the Hungarians, by the Chinese in the eighteenth century.
- Human existence at a material level was determined by the sorts of resources available to any given society or civilisation. This meant the sorts of crops grown, the animals domesticated and the sources of fuel, building materials and clothing. No society had economic growth beyond a certain level.
- Human existence was influenced by natural climate change with prosperous periods generally found during periods of warmth. Human beings were vulnerable to outbreaks of disease, including large epidemics including Justinian’s plague and the Black Death.
- The lives of individuals were much shorter than today, they were more vulnerable to disease and chronic pain. Women died in childbirth, large numbers of young children died. Individuals, especially in agricultural societies, were much shorter than people today.
- Warfare was endemic as societies battled for resources. One of the primary outcomes of warfare was the creation of ever larger empires which then created a zone of peace within their borders.
- Different civilisations developed different belief systems in terms of religion and philosophy. In Eurasia this can be seen in different paths taken by different civilisations.

- There was a slow but definite growth of the connections between the various peoples of the earth so that by about 1600 silver being mined in South America by the Spanish largely ended up in China.
- There was slow progress in the development of technology and science. Much of this development occurred outside of Europe, especially China, and included such things as printing, paper and the creation of zero and Arabic numerals and zero, invented in India.
- In Greece and Rome there developed political systems which allowed for popular participation as opposed to the autocratic political systems found in empires almost everywhere else in the world.

It is important that students have a grasp of these features of pre-modern societies so that they can understand the nature of human existence in the past. This is more important than a list of civilisations and societies. It also needs to have a global dimension. For example, it would be both interesting and instructive for students to appreciate how the eruption of Tambora in 1815 affected large parts of the Northern hemisphere, including Europe and North America.⁴

I should now like to turn my attention to the curricula for the individual Years 7 through to 10.

Year 7

This should be the 'Pre-Modern World' part 1 rather than the Ancient world as is presently the case.

At present it consists of an overview which constitutes 10 per cent of the teaching time and three depth studies. The first, Investigating the ancient past, is compulsory while the second, the Mediterranean world has three options, Egypt, Greece and Rome while the third the Asian World has two options, India and China.

The description for each of these overviews is identical which indicates a rather rigid, nay bureaucratic, approach to these areas of study. They are templates which assume that every civilisation is the same. This rigid approach does not allow for the reality that each of these civilisations had quite different features and developed in different ways over time. In fact, the descriptions are very ahistorical as they do not indicate that the civilisation under consideration changes over time. This view is confirmed by reading the Oxford Big Ideas History 7 chapter on Rome where details from one thousand years of Roman history are jumbled together following the curriculum template. No real sense of change over time is conveyed by this technique.

The real issue is what this part of the curriculum delivers for students and what will they know when they have completed it. As discussed above they will not have an appreciation of the structural factors driving the societies of this time and a patchy and possibly ahistorical understanding of two of these societies, possibly Egypt and India, which do not make a further appearance in the curriculum.

The overview and the first depth study should be amalgamated to provide a general introduction to the factors governing the societies and civilisations of this epoch. Particular emphasis should be

⁴ Gillen D'Arcy Wood, *Tambora: The Eruption That Changed the World*, Princeton, 2014

placed on global warming and the development of agriculture and pastoralism, and how human history over the past 10,000 years has stemmed from these developments.

In discussing the civilisations of this period there needs to be a balance between the Western societies in which lie the origins of Australia's culture, politics and legal system and other societies. For this reason students should ideally have to study both Greece and Rome, as they do in England, with the possibility of specialising in one of them. In the case of Greece there needs to be an appreciation of how the Greek world changed over time, how, in the case of Athens, tyranny gave way to democracy, and how the conquest of Greece by Philip, followed by Alexander's conquest of the Persian Empire spread Hellenism into the wider world. For example, there is the influence of Greek sculpture on statues of the Buddha.

Similarly, in the case of Rome, students need to be made aware of how the republic gave way to the Principate, or empire, and how both Rome was Hellenised and the Western Empire Romanised. There also should be some consideration of how the coming of Christianity transformed the empire and of the importance of Roman law for Europe and the West.

In other words, the questions to be answered and issues studied should be determined by the area to be studied.

India and China both deserve to be studied, although again the topics to be studied should be determined by the civilisation under consideration and there needs to be an appreciation of the historical dynamic. For example there should be study of how the warring states gave way to a unified China and the consequences.

This also relates to the vexed issue of depth studies. The overview is too limited and it would be better if it was expanded and the amount of time spent on depth studies reduced. This could be done if the depth studies were not specified but left to the discretion of individual teachers, taking into account the needs of their students.

There are two issues I should like to address. The first relates to the study of a significant individual. This is a good idea. However, I would advocate the study of Alexander the Great as he figures in the stories of Europe, the Middle East and India (Alexander Romances). He is the first truly 'world historical figure' and there would be benefits in looking at how he is understood in different cultures.

The second relates to interactions amongst the civilisations studied. By about 600 AD/CE there are connections linking them all together, whether it be by trade, beliefs or war. There is a silk route from Rome to China, there is the passage of pastoralists from the Far East to Europe, war between Persia and Rome, trade between the Roman Empire and India. Finally there is the spread of religion across Eurasia, be it Buddhism from Bactria to China and mainland South East Asia, Christianity to Europe, Africa and Asia (Nestorian Christians reached China in the seventh century), Islam from Spain to India, or even the spread of Hinduism in South East Asia and Manichaeism along the Spice Route. In any curriculum purporting to take a world history approach these interactions need to be studied. This issue is partially discussed in Year 8 and could possibly be left to the early part of that year.

Year 8

The curriculum for this year is highly problematic. As discussed earlier the overview looks distinctly Eurocentric. For example it mentions Christianity and Islam as missionary religions but excludes Buddhism. Its structure is decidedly odd. The overview is generally vague and general and mentions the medieval world and feudalism, terms which do not apply outside of Europe. The depth studies are a very strange collection. The first, entitled the Western and Islamic World has four options: The Ottoman Empire, Renaissance Italy, The Vikings and Medieval Europe. No pedagogical reason is provided to justify this rather odd collection of studies. The second, the Asia-Pacific world has three options: Angkor/Khmer Empire, Japan under the Shogun and the Polynesian expansion across the Pacific. The third has also three options: Mongol Expansion, the Black Death and the Spanish Conquest of the Americas. Quite frankly it is difficult to see what links these various studies together and what the student is meant to have learned after having studied a combination of these studies. There is no real explanation of what the 'game plan' is. There is no indication of how studying these topics will prepare the student for the study of the modern world.

It would be preferable if other themes could be found and I would suggest the following:

- The growth of distinctive civilisations, especially across Eurasia, based on differing beliefs and cultural practices.
- Interactions between these civilisations, including the movement of peoples, goods and ideas.
- The consequences of this interaction, including such things as warfare, the adoption of new ideas, practices and food habits.
- The impact of climate change and disease on the way of life of the people.

Regarding the depth studies, it is difficult to see the logic behind the choice of most of them. There should be compulsory study devoted to the study of Western Europe, including the British Isles, as this is the source of contemporary Australia's culture, legal institutions and political structures. One of the listed areas of study should be English constitutional development, including Magna Carta and the English Revolution.

There should be attention devoted to Asia including the Islamic world, India and China. In particular, China needs to be available to be studied during this period as it was the most advanced civilisation in the world and dominated the economy of Eurasia. The history of China is significant for twenty first century Australian citizens in a way that the history of Polynesia is not. Again, it would make sense if teachers were given discretion to decide what they wished to look at in depth.

Overall the real problem with the Year 8 curriculum is that it lacks coherence. This comes from approaching it as the 'Middle Ages'. If it is approached instead as a world composed of differing civilisations founded on different religions and value systems then some sense can be made of it. Again, it would be good to emphasise contact amongst the growing civilisations of the world. Studying Mongol expansion and the Black Death is a good idea, especially if they are linked together and climate change added into the mixture in terms of the effects of global cooling.

It would also be an opportunity for looking at connections between Asia and Europe through a study of the travels of Rabban Bar Suama and Ibn Battutah. A place could also be made for a study of the

voyages of Zheng He and the reasons why the Chinese abandoned maritime exploration in the fifteenth century, thereby contrasting with Spanish and Portuguese maritime expansion.

Year 9

The theme behind this year is meant to be the 'making of the modern world'. From a world history perspective, the coming of modernity through the creation of an industrial society is comparable to the development of agriculture in its consequences. Students need to be made aware of just how industrialisation transformed the world, particularly in terms of its impact on economic growth and the way in which it allowed industrial societies to break out of the constraints of agrarian societies, especially in terms of wealth creation.

Another key question which needs to be asked relates to the fact that industrialisation occurred first in the West. The issue is: why did the industrial revolution take place in Europe, and in particular Britain, and not China? It strikes me that some appreciation of the process of industrialisation and how it made the modern world should be studied by all students not just by some as it is central for any understanding of the modern world. This would include advances in medicine and public health (e.g. sanitation, antiseptics, anaesthetics) as well as the growth of consumerism, improvements in communication (railways, steamships and telegraph) leading to the creation of a single world marked by such features as 'world time'. It is also worth emphasising the ways in which technological developments had an impact on the non-European world, for example, how improvements in communications made the hajj possible for an increasing number of Muslims.

As it stands this year consists of the overview plus three sets of depth studies. The first depth study: Making a better world has three possible electives - the Industrial Revolution, Progressive ideas and movements and Movement of peoples. The second depth study has two possible electives: Asia and the world or Making a nation. The third depth study, World War I is compulsory.

It is very problematic that students study either the Industrial Revolution or Progressive ideas and movements. They should be aware of both of these developments. Movement of peoples is of lesser importance, except insofar as it was a consequence of a modern industrial world. The fact is that the modern world is a product of a whole range of political and social ideas which were insignificant before about 1750. In particular the idea of democracy was viewed negatively before the nineteenth century in both the West and the Islamic world. This section should be renamed Modern ideas and movements as the term 'progressive' has ideological connotations and hence is not an appropriate term to be used for a school curriculum.

It is curious that both liberalism and democracy are absent from the list of movements and ideas for this section. This is odd as these are the two sets of ideas which have had the greatest impact on the modern world, especially Australia. The point of this section should be to make students aware of those ideas which have been significant in creating their world and this means a whole range of ideas including liberty, equality, constitutionalism and the rule of law, and nationalism.

It is clearly important that Australia over the past two hundred years be understood by students in the context of the creation of this new dynamic world of the nineteenth century, in economic, social, political and cultural terms. Under the current structure this may or may not happen. This is

particularly important as the final (compulsory) depth study for this year is on World War I. As it stands the various depth studies do not provide much in the way of preparation for an appreciation of the significance of World War I in the history of the world. There seems to be no principle guiding the study of the nineteenth century, the century which saw the transformation of the world through the movement of ideas, people, goods and inventions, and the creation of the key institutions of modern Australia.

It would be better if the areas of common study were expanded so that all students studied the Industrial Revolution, modern ideas and movements and the global consequences, with particular attention to Australia and, if possible, also China. Students need to get a sense of the transformation which occurred in the nineteenth century and its impact worldwide. Only in this way will it be possible for them to appreciate just how much of a watershed World War I was, and how it shattered the globalised, and apparently peaceful, world of the early twentieth century.

One way to do this would be to have a first compulsory section entitled ‘transforming the world’ which discussed the Industrial Revolution and the French Revolution and the ideas which it helped to create. At some stage there needs to be a discussion of China, with a discussion of the decline of China in the nineteenth century as a consequence of these transformations.

A second section could focus on Australia considering how these transformations helped to create Australia. This could include the growth of democratic institutions in Australia, the effects of technology in areas such as communications (how the railways transformed Australia) as well as the interaction between the incoming British and the Indigenous Australians. In particular it could look at the extent to which Australia has always been tied into global networks through selling its products on international markets and by the need to borrow money to develop infrastructure, as in the construction of the various rail networks in the nineteenth century.

Again it should be left to the discretion of the teacher as to which aspects of these developments about which they will conduct a depth study. For example, one group of students might wish to explore the meaning of democracy, another class explore the Opium Wars in China, and a third to consider nineteenth century America and the American Civil War.

Regarding the approach to World War I, there needs to be a balance struck between the war as a world transforming event and its importance for Australia. This should include a discussion of Gallipoli and Anzac, as well the role of Sir John Monash.

Year 10

The objective of this year is the history of the world during the last 100 years and Australia’s place in it.

This curriculum fails to deliver in this regard. The overview mentions such things as the Cold War and developments in technology. It has a compulsory depth study on World War II. But the last two depth studies fail to place an appropriate capstone on four years of historical study. They should provide an opportunity for students to consider both how much the world has changed over the past seventy years (and by extension how far human beings have come in the last ten thousand years) AND to consider the major international developments of recent years.

Unfortunately the final two depth studies do not deliver in this regard. One of the depth studies is termed Rights and freedoms and is compulsory. Important as the study of rights and freedoms are for students they are not an appropriate field of study in history. It is a topic which should be in the civics curriculum. The final set of depth studies is entitled a Globalising world. Considering that one of the themes of world historical approach is the growth of networks linking peoples together this is an appropriate theme for the final part of the curriculum. However, the three options on popular culture, the migrant experience and the environment movement fail to deliver on this theme. This final set of topics are totally inadequate for giving students an appreciation of the contemporary globalised world and Australia's place in it and should be junked. They do not provide a suitable capstone for four years of historical studies.

In fact, my view is that the whole of the Year 10 curriculum should be re-written. At this point we have students who are fifteen or sixteen. This is the one opportunity to provide students who are relatively mature with an appreciation of the sorts of changes which are now shaping the world in which they will be fully participating within a few short years.

The first part of the curriculum is sensible with a focus on World War II. However, there is a good case for including a discussion of the Treaty of Versailles and its consequences, not just for Europe but also for the Middle East down to the present day. This could be treated at the end of Year 9, but is important because it is the first time that Australia took a place on the world stage and the contemporary world cannot really be understood without an appreciation of the Treaty of Versailles.

Also the Asian dimension of World War II needs to be emphasised, especially Japanese aggression in China. The war needs to be understood in global terms.

Despite what the curriculum might suggest, World War II was not the end of history. There needs to be a strong treatment of how the world has changed over the past seventy years, and I would suggest that this could be achieved as follows:

- A consideration of the major developments of the past seventy years. In particular this should involve a consideration of the place which the United States has played. In fact, one of the deficiencies of the curriculum is the limited treatment which it gives to America, given that it has been the most important country in the world over the past seventy years. Within this framework there should be a depth study which permits students to focus on a particular country or region. Again, this should be left to the discretion of the teacher but a number of topics could be suggested including China, the European Union, India, Russia and the United States.
- There needs to be proper study of Australia in a globalised world focusing on how Australia has been transformed by the end of the 'tyranny of distance'. Obviously the migrant experience could be included here and there could be some discussion of popular culture and environmentalism but the focus should be on how Australia has been transformed since World War II. Teachers could determine on a depth study which looked at the connections between Australia and the wider world.

Comparing history curricula

I shall begin this section with a short description of the two curricula chosen for benchmarking for this review which are England in the United Kingdom and Singapore.

History is a compulsory subject for study in England for Key Stages 1, 2 and 3 of the English National History curriculum. This involves students from the age of five to fourteen. It has three foci which are British, world and local history. The primary focus is British history but students also undertake some study of their local area and selected studies of the rest of the world. Amongst its aims is included the following: ‘achievements and follies of mankind’.

The primary curriculum (Key Stages 1 and 2) focuses on Britain prior to 1066 with a final section on post 1066 developments. However, students do not only study British history. They must also study:

- *the achievements of the earliest civilizations – an overview of where and when the first civilizations appeared and a of depth study one of the following: Ancient Sumer; The Indus Valley; Ancient Egypt; The Shang Dynasty of Ancient China*
- *Ancient Greece – a study of Greek life and achievements and their influence on the western world*
- *a non-European society that provides contrasts with British history – one study chosen from: early Islamic civilization, including a study of Baghdad c. AD 900; Mayan civilization c. AD 900; Benin (West Africa) c. AD 900-1300⁵*

The same is the case in the secondary curriculum (Key Stage 3). The focus is again the history of Britain, this time from 1066 to the present, but students must also study the Holocaust and:

at least one study of a significant society or issue in world history and its interconnections with other world developments.

For example:

Mughal India 1526-1857; China’s Qing dynasty 1644-1911; Changing Russian empires c.1800-1989; USA in the 20th Century.⁶

As well, there is a requirement that students make some study of their local history at secondary school level.

Singapore does not teach a subject called history in primary school. Instead it teaches social studies which has a very strong historical component. It does teach history in junior secondary school for two years. At secondary school level there is the express curriculum for more academic students and the normal curriculum but the content is largely the same.

The primary curriculum begins with the student’s local surroundings to that of the nation and then to Singapore with a focus on the various ethnic groups who comprise Singapore. Only with Primary Four is the issue of ‘Valuing Our Past’ addressed with studies of the various groups who compose Singapore’s population. The rest of the primary curriculum deals with the wider world. Attention is given primarily to the ancient world, including Greece, Rome, Sumer and Egypt but specifically India

⁵ Department of Education, History programmes of study: key stages 1 and 2 National curriculum in England, 5

⁶ Gillen D’Arcy Wood, *Tambora: The Eruption That Changed the World*, Princeton, 2014

and China, and including consideration as to why these civilisations are important for the contemporary world. Finally Southeast Asia is studied.

The junior secondary history curriculum is two years in length and contains four units. The first two units cover the history of Singapore from circa 1300 to the Japanese Occupation and Units three and four cover Singapore up to the present day. Its goal is the creation of good citizens.

Examining these two curricula my judgement is that they both do a good job of introducing the 'significant past' of each nation to the students. Obviously each curriculum has quite different content but when placed in their national context they would seem to work well.

I should now like to examine some key features of the two curricula. The positive aspect of the English curricula is that it is relatively short, expressed in clear English and not excessively prescriptive. The English curriculum largely gives non-mandated examples of what could be taught and allows for much greater choice by individual schools. In comparison, the Australian Curriculum is prescriptive specifying what the depth studies should be, and providing only limited choices. The flexibility of the English curriculum would be welcome in Australia, a country which is geographically and culturally more diverse than England.

The Singapore curriculum is much longer and specifies much more, in my view too much. I was impressed by the way in which the Singapore curriculum set out content, learning outcomes, concepts and values and attitudes. These are set out in tables which link together knowledge, values and attitudes and historical concepts. It clearly intends to produce future citizens of Singapore of a particular type. To me this is somewhat rigid, but there is a clarity which the Australian Curriculum lacks. In the Australian Curriculum, the content is separated out from the achievement standard and the historical skills such that it is not clear of the linkage between them.

The English are not prescriptive in their curricula for the following reason as stated in their framework document:

3.2 The national curriculum is just one element in the education of every child. There is time and space in the school day and in each week, term and year to range beyond the national curriculum specifications. The national curriculum provides an outline of core knowledge around which teachers can develop exciting and stimulating lessons to promote the development of pupils' knowledge, understanding and skills as part of the wider school curriculum.⁷

Compared to the English curriculum, the national Australian history curriculum is overly prescriptive in a rigid bureaucratic fashion. This can be seen in the way the same template is used for a number of ancient empires in Year 7 despite the different nature of each of these empires. There is a lot of merit in following the English model; it should set out a rigorous narrative structure for the curriculum while leaving the choice of the depth studies to the individual school and teacher. The curriculum documents should merely provide suggestions. This would also mean more time being

⁷ Department of Education, The national Curriculum in England: Framework Document 2013, 5

allocated to the overview so that students can achieve a rigorous understanding of human history rather than the farrago which I discovered in the Year 8 textbook.

Both the Singapore and English curricula specify certain concepts which students need to know and understand. The Singapore curriculum is particularly strong in its specification of concepts which are set out as part of the curriculum.

These include for junior secondary: history, archaeology, maritime kingdoms, trade, colonisation, identity, constitution, independence, sovereignty, citizenship, diplomacy.⁸

These key concepts are largely absent from the Australian Curriculum. There is little mention of such key concepts as democracy in the Australian Curriculum. The absence of specified concepts is a real deficiency in the Australian Curriculum. The study of history, if it is to be more than just the telling of a story, requires conceptual tools which need to be understood by students. Concepts such as nation, democracy, empire, liberalism, citizenship, (this is not an exhaustive list) are crucial for any understanding of Australian history. It would be more profitable if, following England and Singapore, the curriculum indicated some of the concepts of which it believed Australian students should have an understanding. This would be far more useful than spelling out, and specifying, the content of depth studies in such a detailed and bureaucratic fashion. In a world history curriculum such concepts are crucial as they allow students to make sense of global historical change. Students need to be able to understand how such things as agriculture, trade, empires, religion, individuals, war, climate change have driven human history to where it is today.

It is interesting that Singapore includes terms such as trade in its list of concepts. This is done in recognition of the place of Singapore in the world and its dependence on global trade. Such terms do not appear in the Australian Curriculum which is very peculiar given that Australian economic development over 200 years has depended on the influx of foreign capital and the development of products for sale on international markets beginning with wool. It is very odd that Australian students are not made aware of these realities of Australian economic life, especially given its explicit world history focus. The curriculum fails in economic matters because it does not allow Australian students to explore and appreciate the economic foundations of Australia or the economic reality of Australia's place in the world.

Summing up, the strengths of both the English and the Singaporean history curricula are as follows:

- They focus on Britain and Singapore respectively but have a strong focus outside of their own nation. In Britain, world history is specified in the curriculum while for Singapore this occurs largely in the primary social studies curriculum and results from a desire to emphasise the multiple roots of Singapore. The important thing is that at the primary school level attention is paid to other countries. This is not the case with the Australian Curriculum where the focus at primary level is almost exclusively Australian. It would be better if young minds could expand their horizons beyond Australia.

⁸ Curriculum Planning and Development Division, Ministry of Education Singapore, 2014 Lower Secondary Teaching Syllabuses, 31–5

- Both provide a strong and positive outline of what will be taught in their history curricula based on a good appreciation of what constitutes their 'significant past.' For England this means English/British history from Roman Britain to today but including significant world empires, ancient Greece and Rome and the Holocaust. For Singapore this means ancient India, China and South East Asia followed by the modern history of Singapore. There is logic in the way in which they discern what history is relevant for their students to study. In contrast the Australian Curriculum does not have a clear sense of what the 'significant past' is for Australian students. This can be seen clearly in the various depth studies which students undertake. Things which are compulsory for English students such as both Rome and Greece are made optional for Australian students while Australian students are given options in their depth studies which are only marginally relevant to their past, such as Polynesian migrations. The English and the Singapore curricula give a clear sense of who these two nations are and from where they have come. The Australian Curriculum does not.
- Both the English and Singaporean curricula set out clearly the structure of the curriculum and indicate the areas to be covered. However, beyond this the English curriculum does not go into great detail as to what is to be taught. The Singapore curriculum is more prescriptive than the English one. The English curriculum indicates that 'depth studies' should be undertaken but does not specify what those depth studies should be, leaving such matters to the teacher. This is in line with the principles of the curriculum which state that it represents an 'outline of core knowledge' around which teachers should build their lessons. This means that both of these curricula provide structure for teaching without being excessively prescriptive. By way of contrast the Australian Curriculum lacks an overall coherency and structure but is much more prescriptive when it comes to describing content. It limits, unnecessarily in many cases, the choices which a teacher can make regarding depth studies, while providing little guidance with regard to the structure of the various overviews. The result is that students will embark on a collection of depth studies with little rationale given for the choice of these depth studies. It would be far better if greater structure was given for the overview and the teacher given much greater freedom with the depth studies.
- Both place a degree of emphasis on historical concepts. It is particularly a feature of the Singapore curriculum. As noted, the lack of historical concepts is a particular weakness of the Australian Curriculum. It would be far better if more emphasis was placed on the relevant historical concepts which Australian students should be able to use to understand the past and make sense of it.

Both the National Curriculum in England and the Singaporean curriculum documents possess the virtue of setting out what needs to be studied in a succinct but rigorous fashion. In particular, the history programmes of study in English allow the teacher the opportunity to choose depth studies which would be appropriate for their classes. The National Curriculum in English merely provides guidance in this matter.

Compared to these two documents the Australian Curriculum lacks clear objectives which indicate what the 'significant past' for Australian students should be. It also lacks rigour in terms of its approach to the historical concepts which students should know and be able to apply to historical analysis. At the same time it meanders all over the place in terms of content.

Part of the issue is that the Australian Curriculum is much more ambitious than either the English or Singaporean curricula, both of which take a much more narrow national approach than the Australian Curriculum does. In my view the world history approach of the Australian Curriculum is a superior one for students in the globalised world of the twenty first century. It also extends over four years while the Singaporean curriculum goes for only two years and the English curriculum for three years. The problem is that the meaning of world history has not been thought through with any great rigour and what we presently have lacks coherence, something present in both the English and the Singaporean curricula.

As mentioned earlier in this report the issue with those teaching the new curriculum has long been how to ensure that the amount of content does not become excessive. This clearly is not a problem with the English curriculum as it leaves much to the teacher's discretion. The Singapore model is more prescriptive. However, there is a good argument for looking more carefully at what is absolutely essential to go into the curriculum and to mandate that content. The depth studies could be left to teachers with suggestions given as to what might be appropriate. As Australia is a multicultural society composed of individuals from a range of national and religious backgrounds this approach will permit teachers to focus on those things appropriate for their students.

Conclusion

After examining the Australian Curriculum: History documentation and then benchmarking it against the national history curricula of England and Singapore it is possible to draw a number of conclusions:

- The Australian Curriculum sets itself the goal of teaching Australian history within the broad framework of world history. Despite my criticisms this is the most appropriate form of history to be taught in Australian schools in the twenty first century. The problem is that the curriculum lacks a real understanding of what world history means. What it presents students with is a strange collection of topics for study which often have little connection with each other and which may have been included to fulfil the cross-curriculum imperatives rather than for sound educational reasons. The worst examples, as discussed above, are in Year 8 and Year 10.
- The cross-curriculum priorities are a hindrance to the educational goals of a first quality history curriculum and should be abolished. The curriculum needs to be guided by principles which have the discipline of history at its core.
- Given that the goal of studying Australian history within a world historical framework is an appropriate one for twenty first century Australian students, and that there does not seem to be a clearly stated rationale for achieving that goal, then it is imperative that some principles be established for achieving that goal. Otherwise the curriculum will remain largely a collection of topics.
- The first principle which should be applied is that of the 'significant past' which means identifying those aspects of history with which an Australian student in the twenty first century should be familiar, always bearing the limited amount of time available to teach a world history curriculum with a huge number of possible topics.
- One means of delivering the significant past is to make more effective use of historical concepts as a means of delivering the curriculum. One key change would be to get rid of the three stage

historical periodisation used by the curriculum and replacing it with a simple pre-modern/modern schema with the eighteenth century and the changes which it brought as the transition point. Another change would be to identify themes such as agriculture, war, natural climate change, empire, civilisation, culture, religion, as tools through which commonalities and differences amongst the peoples of the earth can be identified. A third change would be to place more emphasis on the interactions amongst the various societies of the world and how they have grown over human history.

- Most attention should be paid to ensuring that the curriculum provides a coherent and meaningful picture of the human past which equips them to become citizens of twenty first century Australia. The curriculum is not meant to train historians. To this end work needs to be done in shoring up what are now described as the overviews to provide more structure for students. Depth studies should be retained but with changes and with less of the curriculum devoted to them. Their content should not be mandated, as is presently the case, but they should be left to the discretion of the school and individual teacher. This would allow school and teachers to develop depth studies appropriate to their school population. This is important as Australia is culturally and religiously diverse. As it stands the curriculum is far too prescriptive and rigid.
- One issue raised by the English curriculum is the place of local history, particularly in the secondary curriculum. As Australia is a federation there should be some opportunity for students to look at their local history. This would be achieved most expediently through a depth study, suggested not mandated.
- Following the English curriculum, the Australian Curriculum should be less prescriptive and much less bureaucratic. It should mandate a rigorous conceptual framework and outline of topics but beyond that it should follow the English model and provide suggestions for depth studies rather than prescribing them. As noted above, a national curriculum in a diverse society such as Australia should be as flexible as possible. Some topics should be mandated, including Anzac Day and following the English curriculum, the Holocaust.
- As the purpose of world history is to encourage a more global appreciation of the history of humanity it is worrying that the primary school curriculum is almost exclusively Australian in focus. This is not the case in either England or Singapore. There should be more global content in the primary years. This could be done by following the Singapore model and exploring the historical backgrounds of some of the peoples who have come to Australia. Again the content of this component would vary according to the school population.
- I was very disappointed by the quality of the textbooks written for the current curriculum which I have encountered. They contain factual errors and false statements. I see part of the problem to be the lack of coherence in the curriculum which has passed over into the textbooks. If the changes I suggest are implemented textbook quality should become less of an issue but there needs to be more effective checking of textbooks. We should not tolerate factual errors in them.

8. History (Foundation to Year 12) – Mr Clive Logan

Executive Summary

This report provides an analysis and evaluation of the Australian Curriculum for history for Foundation to Year 12 in terms of its robustness, balance, scope for choice and flexibility, making comments on the soundness of the general capabilities, achievement standards and the appropriateness and relevance of the cross-curriculum priorities as they apply to history. Comments on the appropriateness of coherent chronology, detailed evaluation of history's content descriptions and elaborations are included for each year and each course. Part B of the report benchmarks the Australian Curriculum against the English National Curriculum and Singapore's Primary Social Studies Syllabus and history Syllabus: Lower Secondary.

In Part A of the scoping brief, the report finds that the Australian Curriculum for history has a balance of knowledge and understanding, key concepts and skills that provide a sound disciplinary framework. It has a well-thought out progression, logical in structure, scope and sequence with a determined view to give a breadth of local, Australian and world history as possible. The report finds that the curriculum has rigour, flexibility and clarity, providing the fertile ground for ideas and debate. It also finds that the curriculum provides students with the opportunity to develop skills to analyse, be creative, critical thinkers, be able to synthesise information, collaborate, problem-solve and communicate effectively.

The report finds that the general capabilities are identified throughout the content descriptions with icons. Some of these general capabilities are used more than others throughout the history curriculum. They tend to work efficiently due to the content, skills and attitudes involved in the study of history. There are concerns that teachers may perceive this as a checklist, meeting the requirements of the national curriculum.

The report also finds that the three cross-curriculum priorities, represented with icons, naturally fit with the content, skills and attitudes of history, although sustainability may be more suited to the geography curriculum. They are essential to the structure of the curriculum so long as they are not manufactured into every unit of work – otherwise they may appear to be tokenistic or contrived.

In the primary years, the content moves from personal to local to national history and all students gain understanding of what made up the story of Australian history. There is a firm coherent and chronological pathway evident. There is prescribed content throughout – yet there is enough flexibility for teachers to use local issues to provide meaningful context. Concerns have been raised about the place of history in the primary curriculum and how teachers interpret the concepts and skills.

For Years 7 to 10, in direct contrast to that of the Foundation to Year 6 years, the report finds some mandatory units have been established but there is choice in the depth studies allowing for teacher expertise and interest to provide rich and interesting choices in diverse areas. Concerns have been raised about the links and connections within each year and that students may not gain an essential body of knowledge. There is a discussion on whether there should be more mandatory topics to reduce the importance of topics perceived as 'obscure and ephemeral'. The report recommends the need to have more of a 'core curriculum' in the Years 7 to 10 syllabus while still acknowledging the need for choice and variety for students to undertake historical investigations.

The report commends the ancient history course for the way in which the four units have been developed in a conceptualised manner, as a holistic study of the ancient past that is constructed from textual, visual and archaeological sources of evidence. There is choice with no mandatory selection but with requirements to study two areas in most units, giving breadth but also time for depth.

In contrast, the report recommends that the modern history course, while comparable with the ancient history course in the way in which the four units have been developed in a conceptualised manner, does not fit as well. It is recommended that this course needs review.

In Part B of the Scoping brief, the report acknowledges the similarities between the National Curriculum in England and the Australian Curriculum. Overall, there is a much more open curriculum in England as teachers have the opportunity to develop their own approach to the way the content is taught around the three concepts of national, local and world history. The National Curriculum in England's latest rendition maintains the integrity and robustness of the standards expected. The Australian version is in its initial rendition, is content-heavy and broader in scope than its English counterpart with two extra years in which history is taught. Both have been generated by input from history professionals and educators.

The Primary Social Studies Syllabus in Singapore incorporates the study of history within a Social studies framework. This syllabus acknowledges the similarity with the Australian primary curriculum in that there is a strong focus on the awareness of identity, community heritage and local/national history. The main difference is the strong emphasis on the role of citizenship that the Singapore document embeds, more than that of any other curriculum, due to the broader nature of Social studies than the unique study of history.

The History Syllabus: Lower Secondary in Singapore is narrow in scope. Even though there is the stated intent to provide students with the fundamental historical concepts and skills required in the study of history, the knowledge of the key developments and forces that shaped the past, the overwhelming emphasis is on Singapore, explicitly stated in the values and attitudes reinforcing expected behaviour from their citizens. This is a heavily mandated curriculum. While assessment modes are encouraged, the formal assessment format reinforces the view that examinations and tests are the best way to evaluate how much students have learned.

The report concludes that the Australian Curriculum for history is a robust curriculum – there are challenging topics and a significant development of historical skills expected of students. There is structure to the whole Foundation to Year 12 curriculum, a logical progression in skills, achievement levels and the organisation of the historical content and skills reflecting the developmental stages of students. There is a breadth of information that is not narrow in scope that exposes students to the world at large and Australia's role in it.

Recommendations discussed include reducing the amount of content in Years 7-10 so that topic areas can be delivered effectively – 4 terms, 25 per cent of the content allocated for each term, more mandatory topics and more connections between topics to provide more of a 'core curriculum' in the Years 7-10 syllabus.

Part A: Introduction

As a teacher of history for the last 35 years in New South Wales (as well as 1 year teaching on exchange in the United Kingdom in 1992), I see that the development of a balanced and robust curriculum for history is like baking a cake. It may be an unusual metaphor but if you get the right mix of all the key ingredients, the *MasterChef* creation will rise in the esteem in which it should be held in education circles and in public opinion, even when heat is applied in the oven of review, so that everyone can taste the delights of successfully following the recipe – so long as one is patient enough to see the results. The intimate chemistry among key ingredients delivers the foundation for a good cake – but it can always be tweaked to produce even more palatable results.

If you get the balance and links wrong, however, it could be a different story. Like the fundamental ingredients one carefully beats into the cake mix, if the correct order of the recipe is not followed and important ingredients are left out, it could lead to a sunken mess or one may end up as dense and unpalatable. A cake is essentially a chemistry experiment – a series of ingredients mixed in a specific order to cause reactions that produce specific outcomes. So whatever cake one makes, one must be sure to follow the recipe instruction closely as it has been tried and tested to produce good results.

The teaching of history should develop a passionate interest in the past and awaken in students an open-minded, broad-vision view of humanity, informed by a love of learning, a love of ideas, a love of books and a love of argument and debate. The study of history must be gripping that hooks the students in with a love of the storytelling of how people lived in the past. As Simon Schama states, ‘Kids need to know they belong to a history that's bigger, broader, more inclusive than the subject they imagine to be the saga of remote grandees alien to their traditions and irrelevant to their present.’¹

The history curriculum has always been, and always will be, the most controversial with challenges of bias. I believe that this Australian Curriculum for history has been well designed and developed, but needs tweaking. The Rationale and Aims define the purpose of why history should be a compulsory element in the education of all Australians from Foundation to Year 10 (more than what has been the case in the UK where it was only compulsory to age 14). However, the statements in the ‘purpose of study’ in the most recent *National Curriculum in England Framework Document* (September, 2013) are more inspiring and engaging:

‘It should inspire pupils’ curiosity to know more about the past. Teaching should equip pupils to ask perceptive questions, think critically, weigh evidence, sift arguments, and develop perspective and judgment. History helps pupils to understand the complexity of people’s lives, the process of change, the diversity of societies and relationships between different groups, as well as their own identity and the challenges of their time.’

¹ Schama, Simon (2010). My vision for history in schools, The Guardian, Tuesday 9 November 2010, found at: <http://www.theguardian.com/education/2010/nov/09/future-history-schools>

It is similar to that of the Australian Curriculum but more inspirational and reflective of what ‘good’ history teaching is.

This curriculum is currently being introduced at different times by teachers in primary and secondary schools throughout the country, in different contexts in each jurisdiction, sector and schools with severely constrained resources of time and materials. In some sectors, teachers have history qualifications and are specialist history teachers. But generally, schools across the nation are teaching history, mainly in the primary years, with teachers who have no understanding of the methodology in the teaching of history; and with harshly restricted hours given the crowded curriculum. The danger is that there is no more guaranteed recipe for boredom for students than subject matter taught as an exercise in ‘learning’ by someone who is passionless about the past.

Overview - Foundation to Year 10 - Chronology

Simon Schama states, ‘There can be no true history that refuses to span the arc, no coherence without chronology’. There is a definite sense of chronology and a logical progression in the organisation of the curriculum that formulate the study for each year:

- Foundation to Year 2 has its focus on awareness of the students’ own world, on family history and community heritage as they commence their educational journey. Starting from their own social context, students are given the opportunity to expand on their knowledge and understanding of how the past is different from the present including looking at the significance of local history.
- Years 3 to 6 has as its focus on local/Australian history and use of a range of sources to explain different points of view about how Australia developed as a nation with contributions by key individuals, groups and events in a chronological pattern that makes some of the more difficult concepts able to be managed.
- Years 7 to 10 has its focus on world history and Australia’s role within world history from the Ancient World (Year 7), the Ancient World to the Modern World (Year 8), the Making of the Modern World (Year 9) and Overview of the Modern World and Australia (Year 10). There is an obvious chronological approach used here with a focus on both overview and depth studies with choices available.

This curriculum has a well-thought out progression, logical in structure and scope and sequence with a determined view to give as wide a breadth of local, Australian and world history as possible. The range and the chronology of the case studies moving from Years 7 to 10 capture the changing forces and events across the spectrum of views and experiences from the history of the world. It is wide and comprehensive, does not promote any agenda but allows teachers to examine different theories, causes, roles, beliefs and effects as well as allowing for different interpretations to be examined. For example, for the topic of World War I in Year 9, one of the elaborations asks for students to investigate the ‘commemoration of World War I, including debates about the nature and significance of the Anzac legend’.

It is not a stroll down memory lane to make us feel good, to glorify the past or to escape the woes of the present. We need history’s long look at our national makeup and the role we play within the world. The interesting issue is who determines what should be included or excluded, the ‘distinction

between the inessential and the indispensable’ and the philosophy underpinning the curriculum. Should there be more mandated topic areas? Should it be a Eurocentric view of history or should it include a range of different issues, viewpoints or ‘obscure and ephemeral’ topics from which to choose? This is of course one of the key problems in the teaching of history, as history changes over time, new evidence is found, new interpretations are presented and new pressures exerted from society to ensure that different groups are represented in the historical narrative.

Overview - Foundation to Year 10 – Knowledge and Understanding

The scope and sequence clearly defines the year level focus, the Key inquiry questions posed for each year, the Key concepts for each of the ‘stages’, the knowledge and understanding for Foundation to Year 6 and the overview and depth studies for Years 7 to 10. This again shows a logical progression that assists teachers to formulate their teaching programs in a logical, chronological manner and brings the focus to the key areas selected for study.

It is also good that content elaborations are provided for Foundation to Year 10 to illustrate and exemplify content and to assist teachers in developing a common understanding of the content descriptions, to unpack the content descriptions provided. Even though they are not intended to be comprehensive content points that all students need to be taught, there could be a tendency for some teachers to use this as a checklist (even though most start with ‘for example’ or ‘such as’). These give a clear indication of the progression that could be taken – most will be followed, even though they are voluntary, as it provides a pathway but allows for flexibility and teacher choice.

There is sound information on the Australian Curriculum, Assessment and Reporting Authority (ACARA) website to assist in developing a high-quality curriculum for all students, promoting excellence and equity to the diversity of learners across the nation and ensuring that the curriculum is inclusive of the learning needs of all students. Giving advice for student diversity with disability, meeting the individual learning needs of gifted and talented students and helping students who are learning English as an additional language or dialect means that the Australian Curriculum has to be flexible enough to cater for the culturally diverse requirements across the nation and to meet the individual learning needs for all students.

The curriculum development process has been a positive one. There have been a number of consultations with feedback from a number of key interest groups involving representatives from a wide range of schools, associations and jurisdictions. In examining the content topics, the content elaborations, the historical skills and their elaborations for each year and the achievement standards expected by the end of each year, there has been a significant amount of time, effort and involvement of specialist educators and practitioners of history. Some mandatory units have been established but there is a breadth of choice available allowing for teacher expertise and interest so that students have the opportunity to not only understand the emergence of Western civilisation, the democratic principles underpinning Australia’s development, but also to provide rich and interesting choices in diverse areas. However, there is some concern about the links and connections between each of the depth study topic areas for each year in the Year 7 to 10 syllabus. Due to the wide range of choice, and limited mandatory topics, it could be argued that students may not gain an essential body of knowledge.

Overview - Foundation to Year 10 – historical skills

The scope and sequence of historical skills has a rubric that is easy to navigate and to see the skills being developed progressively in association with the range of cognitive, emotional, social and physical changes that students undergo as they move through the years. Apart from the first three years (Foundation to Year 2) where students are in their early developmental stages, the remainder of the years' skills are in bands of two year intervals that allow these skills to be developed across a range of different topics to eventually demonstrate sophisticated skills to communicate their understanding of history and the use of evidence to support their arguments. The skills of chronology, terms and concepts; historical questions and research; analysis and use of sources; perspectives and interpretations; explanation and communication, have all been clearly mapped and are explicit as the key historical skills required in the curriculum. Knowledge and understanding and historical skills are well integrated in the teaching and learning program, the former being the context in which the skills are to be developed. They are age appropriate throughout all years for the cognitive development of students at the ages where most students would fit but also for those who may be ahead or behind in their chronological age. For a number of different jurisdictions, these skills are brand new, all of which makes added time for history in the curriculum essential so that it does not just simply develop into a disconnected 'jog trot' through time without understanding the essential skills that need to be translated into teaching programs. This area is well developed – all the historical skills are essential for the study of history.

Overview – achievement standards

Knowledge and understanding and historical skills are backed up by the achievement standards at the end of each year, the expectations of what should be the outcomes for each year. The written description gives a clear expectation of what should be achieved, is succinct and gives a clear indication for the end of the year to then be ready for what is to be done the following year. The work sample portfolios on the ACARA website are good examples of expectations of what might be achieved by students at one of three levels (satisfactory, above satisfactory and below satisfactory). It is this Student portfolio summary where the connections between the tasks being undertaken, the knowledge and understanding gained and revealed, and the concepts and skills are revealed.

They are generic in nature in the syllabus documents – in the primary years, they are succinct and point to the outcomes to be achieved for that year. They focus on the concepts and skills and not on the content. Teachers and parents would have to go to the ACARA website to see student work samples as they provide the evidence of what has been accomplished. In Years 7 to 10, the descriptions have to be generic given the wide choices available – they follow the same nature as the primary years. The possible way to overcome this would be to provide the links in the syllabus in each year to the ACARA website for those interested in examining examples of student achievement.

Overview – general capabilities

The seven general capabilities are an outcome of the broad learning outcomes defined in the *Melbourne Declaration on Educational Goals for Young Australians (the Melbourne Declaration)*² and in the subsequent shaping and writing of the Foundation to Year 10 Australian Curriculum: History. These general capabilities are identified throughout the content descriptions with the icons that represent each of the general capabilities.

It is noticeable that some of these general capabilities are used more than others throughout the curriculum. Fortunately, most of the general capabilities can easily be absorbed into the study of history as they do encompass the knowledge, skills, attitudes and behaviours in our world today. Even numeracy, the least absorbed capability, can easily be marked with chronology and in the sequencing of events and the use of statistics and tables containing data can be used in the Years 7 to 10 content areas. Even though there could be a tendency to feel that we have to incorporate all areas of study into each of the subjects in the national curriculum, for history they tend to work and work efficiently. It is the nature of the content, skills and attitudes that are involved in the study of history that make this workable. However, with icons representing each of the capabilities, there could be a tendency for teachers to perceive this as a checklist and to tick them off as meeting the requirements of the national curriculum.

The learning continua for each of the capabilities is well mapped in a huge document evidencing how they apply across all subjects, not just history. There is a rubric of six levels with examples and coding for each subject (where appropriate), revealing the skills, behaviours and dispositions that students are reasonably expected to have developed by the end of particular years of schooling. This is well devised, is rigorous in expectation but still allows students opportunities to develop capabilities over time and across learning areas, recognising that each student's pace of development is influenced by a number of factors. However, these may be largely ignored as they are on the ACARA website which teachers may not always go to as they depend on their print syllabus documents produced by each jurisdiction.

Overview – cross-curriculum priorities

The Australian Curriculum is based on three key identified areas that build on the educational goals of the Melbourne Declaration. Again, with the icons representing each of the cross-curriculum priorities, there could be a tendency for some teachers to use this simply as a checklist. They are essential to the structure of the curriculum so long as they are not manufactured or contrived into every unit of work – they must be used wherever the issues are developed or applied otherwise it may appear to be tokenistic or contrived. However, each of the three cross-curriculum priorities naturally fit into the history curriculum. For history, these are not essential to have mandated as they are embedded in the curriculum in the following ways:

² Ministerial Council for Education, Employment, Training and Youth Affairs, 2008, *Melbourne Declaration on Educational Goals for Young Australians*, Melbourne, viewed 13 August 2014, can be accessed at: http://www.curriculum.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf

- It is essential to engage in and celebrate the experiences of the Aboriginal and Torres Strait Islander peoples but the heading contains ‘histories and cultures’. There is a need to have more of an emphasis on these in the content descriptions and the elaborations, particularly in Years 3 and 4 and possibly in Years 7 and 9.
- Australia is geographically located in Asia so our understanding of the diversity of the peoples of Asia and their contributions to the region are important. We cannot ignore our region – it would be to our detriment as we are so reliant on the region economically, socially and politically.
- Sustainability is important for students to learn from the past, to assist in the present and to prepare us for the future. It is only by being informed by historical trends that students make judgments to be equipped with the present world and develop more sustainable patterns of living. However, this may fit better in the geography curriculum.

Overview – Addressing the intent of the Melbourne Declaration

The national curriculum document in history remains true to the intent of the Melbourne Declaration. If one takes from the preamble of the Melbourne Declaration that schools have a vital role to play in ‘promoting the intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing of young Australians’, this provides the direction, the broad and holistic perspective on the goals of education. Of course the history curriculum will not answer every aspect mentioned in this preamble but the two key educational goals of 1) promoting equity and excellence and 2) students becoming successful learners, confident and creative individuals and informed citizens, are addressed in the content elaborations and historical skills – but it all depends on the teachers’ pedagogy – how teachers present the content, develop the skills through meaningful tasks and address the big questions as and when required.

Analysis and evaluation of history’s content descriptions and elaborations

Foundation to-Year 2

For each of the three years in this grouping, the level description under the heading of each year is succinct and easy to comprehend, has enough detail to give an overview and there is an obvious logical progression from one year to the next, building on from the previous year.

The key concepts included in the level descriptions are the same for the three years but there is enough in these to concentrate on some aspects more than others according to what is being investigated or to reinforce the concepts over these early years of education. By commencing this early with the key concepts, it sets up a sound understanding as to what the study of history is all about.

It is the key inquiry questions for each year that is really appealing, as they speak to the necessary processes of historical inquiry that are unique to the study of history.

The content descriptions that follow help to unpack the key inquiry questions further. The interrelation of both the historical knowledge and understanding and the historical skills means that the content should not be studied in isolation but are considered together and become a great framework to practically hang teaching off and on which to base assessment strategies.

There is enough freedom here for teachers to be able to access the particular context of the students, regardless of jurisdiction, sector or school commencing from the social context of the students but by the end of Year 2 exploring the significance of a person, building or historical site that is important, from personal to local history.

The impact of technology into Year 2 is a great time to be introduced as well. Even though they do not have the complex understanding of social media and its impact, they have grown up in a world as 'digital natives' and need to be aware of the significance of technology – most would know how to operate computers, phones and other devices.

These first three years of the history curriculum are rigorous and balanced for children starting out on their quest of historical inquiry. The key concepts and historical skills may appear to be demanding but they are appropriate to the ages of the students and give the foundation required for further historical study. The only criticism I have is in the heading for Year 2 – if there is a key focus on local history, I would recommend using 'Local History', even 'Local History – the Past in your Community'. It would highlight the importance of local history.

Years 3 and 4 – Community and Remembrance, First Contacts

There is a clear link with the previous year's study where there is a move from the heritage of the local area to a broader exploration of the historical features and diversity of their community to the introduction of world history and the movement of peoples. The key concept of 'sources' has been added in the level description for Years 3 to 6 and the historical skills are reflected in students' ability to 'identify sources' and 'locate relevant information from sources' is the next development in the cognitive abilities being asked of the students. Changes in each of the five categories under historical skills for Years 3 and 4 reveal that there are more academic demands placed on the students with explanation rather than description being sought. The key inquiry questions also become more searching in their demands and these are further revealed by the diversity of the issues to be explored in this year's content descriptions.

The issue of remembrance is a key area of the Year 3 content and is a key area that flows on from Year 2 particularly with a study of memorials. Given that we are fast approaching the centenary of the ANZAC involvement in World War I, it is essential that students are educated as early as possible in the understanding of the significance of key events that have binded this nation:

'It is only through knowledge of its history that a society can have knowledge of itself'
(Marwick, 1970).

It is to the next generations that we need to pass on the national memory and carry on traditions. There are enough examples and detail given for Australia and other places around the world to celebrate and commemorate as to why we should not ignore the past.

It is also crucial that this curriculum has a focus on Aboriginal and Torres Strait Islander peoples as the original inhabitants of this nation. There is a focus throughout these two years on the importance of these groups (Year 3) and the diversity and longevity of Australia's first peoples and the nature of conflict between Aboriginal and/or Torres Strait Islander peoples and others (Year 4) but there is no specific reference in either of these descriptions of the 'histories and cultures' of

these peoples, how they lived, adapted to their environment and existed for millennia. It is important for all Australians to know this history just as nations around the world have recognised the importance and significant contributions of Indigenous people openly and honestly.

Given that this is a national curriculum and that these communities settled all over the nation, it is important that we highlight their significant contribution. In the structure of this curriculum, Years 3 and 4 is the starting point to strengthen this aspect of the curriculum. The first key inquiry question for Year 3 ('Who lived here first and how do we know?') is a perfect opportunity for an overview of the archaeological evidence to be examined. With a change or adaptation to the first content description, one could add the evidence of archaeology pointing to the longevity of Aboriginal history and their importance to a local area.

As well, I would recommend reversing the first two key inquiry questions for Year 4 so that the culture and lifestyle of the Aboriginal and Torres Strait Islander people could be highlighted and added to the first content description. Chronologically, it would also work better:

- What was life like for Aboriginal and/or Torres Strait Islander peoples before the arrival of the Europeans?
- Why did the great journeys of exploration occur?
- Why did the Europeans settle in Australia?
- What was the nature and consequence of contact between Aboriginal and/or Torres Strait Islander peoples and early traders, explorers and settlers?

Some of the concepts of these issues are quite demanding and there was some concern raised years ago that when this was taken from the secondary years (particularly in the NSW curriculum) and put into the primary school years that there would simply be a telling of the story of events, for example, the explorers of Australia. There are not as many concerns now as the concepts and skills for these content areas are more explicit at this level of the curriculum and have been addressed appropriately.

Years 5 and 6 – The Australian Colonies, Australia as a Nation

There is a clear link with the previous two years' study where there is a move from an introduction of world history and the movement of peoples to the study of colonial Australia to the development of Australia as a nation. The key concept of 'sources' is still embedded in the Level description for each of Years 5 to 6 and the historical skills are further enhanced in students' ability to not just 'identify sources' but to 'identify and locate a range of relevant sources' and from 'locate relevant information from sources' to 'locate information related to inquiry questions in a range of sources' with the additional 'compare information from a range of sources'. This further highlights the next development in the cognitive abilities being asked of the students through the use and interpretation of sources within a suitable historical context and content.

The key inquiry questions are more demanding and these are further revealed by the diversity of the issues to be explored in these years' content descriptions. There is a strong European flavour here in these two years' content descriptions. In Year 5, I would recommend to see in the second content description the words in the brackets (including *the impact on...*). This gives the opportunity to

discuss incidents like the Myall Creek Massacre and the impact in Tasmania with Truganini or any other regional conflict between the Indigenous populations and the new settlers.

The Year 6 content descriptions have only four issues whereas Year 5 content descriptions had five. The Year 6 syllabus certainly provides the opportunity to investigate the experiences of democracy and citizenship over time so possibly the fourth issue in Year 5 (reasons people migrated to Australia from Europe and Asia) could be added into the Year 6 issues as there appears to be some overlap with the third issue in Year 6. It is also a wide area to be covered (throughout the twentieth century) possibly leading to just an overview given the breadth of the time frame. The content descriptions for Year 6 after the first issue leading to Federation are rather vague and open-ended so may need to be unpacked more to assist teachers to know which areas are of key interest. It may be better to unpack the last issue for this year (economy, education, science, the arts, sport) to make this more workable and to develop more independent learning opportunities.

Summary of analysis and evaluation of history's content descriptions and elaborations: Primary Years (Foundation to Year 6)

By the time students finish their schooling in Year 6, all students, regardless of jurisdiction, sector or school should have a good understanding of the key ingredients that make up the study of history. The content would have moved from personal to local to national history and all students would have broad understanding of what made up the story of Australian history. It is a more complete history, one that does not neglect Europe and the non-Western world. There is a firm coherent and chronological pathway evident that helps students understand events, issues, personalities and movements in a context that they can understand and particularly helps them to understand the history of Australia's development. There is prescribed content throughout – yet there is enough flexibility for teachers to use local issues to provide meaningful context.

There is a lot of content here, particularly for Years 5 and 6. With an increasingly crowded curriculum, one would hope that history is not viewed as being one of the less important subject areas. There is a wonderful opportunity to develop historical literacy in these years. I believe that the content is manageable to be delivered.

What is promising about this curriculum is that there is a good sequence of skills embedded into the content descriptions. There is academic rigour – so long as primary teachers across the nation understand and interpret the concepts and skills. Have they had the sufficient training to be able to decipher the intricacies of the concepts and skills? Is history seen as an important part of the curriculum or does it have a limited place? By demonstrating that history can assist in supporting the necessary concentration and focus on literacy, there is hope that students and teachers will see this curriculum as relevant to the needs of modern Australia.

Another issue to consider is whether there is enough scope here for teachers to encourage more independent learning, to improve modes and methods of assessment, to develop historical literacy, as well as providing more effectively for different groups, such as ethnic and gifted and talented students, across the nation. I would recommend having options for teachers to explore more creative and innovative ways in presenting historical information. For example, one could compare

and contrast Australia's historical narrative with that of New Zealand and/or Canada (with similar narratives).

It will be the way in which the curriculum will be interpreted that will be the main issue but if the key inquiry questions are followed, the key concepts developed and the historical skills interpreted appropriately, I do not see any impact on standards. This curriculum in the primary years does not just focus on a small number of issues: there is a distinct chronology and connections can be made so that students are able to see the overview to answer the 'big questions'. It also focuses on core content that would be considered essential to understanding the way Australia has developed as a nation.

There is enough scope within each of the content elaborations for different modes of assessment – from 'examining two sources of evidence to identify similarities and/or differences', 'placing key events and people in chronological order', 'finding historical information', 'creating charts, pictorial stories, maps, digital and oral presentations' and 'using internet search engines, museums, library catalogues and indexes to find material relevant to an inquiry.' These are clear indicators for assessment and suggestions for different modes of assessment. However, they are not prescribed – 'good' teachers would incorporate interesting and different modes of assessment into each year group.

Secondary Years 7 to 10

Introduction

Because there has been a compulsory element of content to the end of Year 6 with a development in the historical skills and key concepts over the years, one would assume that there would be a core body of knowledge, skills and concepts developed when every student commences Year 7. However, not all students would have experienced learning in exactly the same way, there would have been different pedagogical approaches and emphases throughout the nation and therefore different experiences. For some, it would be a concentration on content; for others, it would be a concentration on the skills and processes and the development of historical inquiry.

One would also expect that teachers in primary years would have used the study of history regularly, in a planned and coordinated manner, as a means of promoting the general capabilities, particularly literacy and, to a lesser extent, numeracy and Information and Communications Technology (ICT). These general capabilities are not specific to history but due to the nature of the subject appear to fit better than many other subject areas particularly in developing and applying the knowledge, skills, attitudes and behaviours that will assist students to live and work successfully in the 21st century.

Simon Schama has a viewpoint that 'Drive-by history is no history at all'. To do the task properly, one must have the time to resource, prepare and make it interesting. I would recommend reducing the amount of content so that topic areas can be studied effectively – four terms, 25 per cent of the content allocated for each term.

There is a vast array of choice in the depth studies offered in each of these years and not much that is mandatory, in direct contrast to that of the Foundation to Year 6 years. There is a sophistication in the development of each of the studies and yet they are heavy in content – but it does open the challenge that these years may lose the ‘grand narrative’ as teachers and students may progress without studying and understanding what could be argued are the core principles, beliefs and values that have underpinned the way the world, and Australia, has developed simply by the choices that are made. What is the ‘distinction between the inessential and the indispensable’? There could be more mandatory topics, particularly in Years 7 and 8, and more links between each topic to reduce the importance of those topics that may be seen as ‘obscure and ephemeral’.

Analysis and evaluation of history’s content descriptions and elaborations

Year 7 – The Ancient World

The first change in Year 7 is the further development of the key concepts, changing ‘sources’ to ‘evidence’ and adding ‘contestability’. This is a subtle shift into the complexity of the way the teaching of history develops in the secondary years where students are asked to look for information contained in sources that support an historical argument or provides information for a specific inquiry (the analysis of sources) as well as exposing students to the different interpretations about the past based on either new evidence or different perspectives (historical interpretation). This further enhances the view that the key concepts in the curriculum have been mapped appropriately across the years, adjusted and adapted to the processes required in historical inquiry at the appropriate age levels of adolescent students.

The introduction of an overview for the historical period is an interesting inclusion. It does provide the broader context for the move into the depth studies that constitute the majority of the time, gives an introduction to the historical period and provides the overlay of the year’s content. The timing of ‘approximately 10 per cent of the teaching time for the year’ provides a guide for teachers for their programming. However, it does not provide the links between the depth studies and trying to examine the important features of a period of 60,000 years is rather daunting even though there is a conscious effort to ensure that there is a strong sense of chronology.

The other change evident in the content mapping is that there is now flexibility of choice in each depth study where up to three electives are offered with one to be studied in detail. This allows room for teacher and/or student interests to be developed as well as allowing the freedom and creativity for students to investigate particular aspects of history across a range of features in the period. The timing of ‘approximately 30 per cent of the teaching time for the year’ for each depth study gives a guide for teachers in their programming.

Under the depth studies (and after the overview and its unpacking), there is the statement that depth study content at each year level ‘can be integrated with the overview content and/or integrated with other depth study electives’. Excellent practitioners would want to integrate the overview as it gives the opportunity to look at the issues in a specific context rather than in an isolated way while trying to examine many issues across a variety of different civilisations. Anecdotal evidence in the first year of implementation of the Year 7 curriculum is that many schools, particularly in NSW, are incorporating the compulsory overview into the first topic as the content

overlaps so much. This allows flexibility but the way the content is set out suggests that it is better to look at the overview separately.

My recommendation is that the overview for Year 7 is unworkable in its current state – there are so many issues and civilisations referred to here for possible examination that it may become confusing for students. Given this is the first year of high school and they are settling into new routines and new experiences, why not consider an issue like ‘Mysteries of the Ancient World’ from a range of different civilisations that may be more student-centred, allows for hypothesis and research and allows for different perspectives – having an enquiry-based approach using a site, issue or debate would be far more attractive to all students commencing high school. A study of bog bodies, mummies, Lake Mungo remains are some examples. Take the third issue out of the first depth study and incorporate it into the overview as an attractive and interesting theme with which to start the students’ journey in high school and attract them to history! Students need to be exposed as early as possible to investigate issues that may still be under question – to understand that we use sources and evidence to come to a conclusion. Here is a perfect opportunity to bring creativity and innovation – and expect that the students’ responses will be sophisticated and well thought out.

This could be then linked to a mini case study: ‘What is civilisation?’ The study of Mesopotamia around the Tigris and Euphrates would be able to incorporate the issues in the overview curriculum content and be a perfect introduction into ancient societies in the depth studies. In other words, I would recommend seeing this overview put into a specific historical context. This could mean that the content and elaborations in the first depth study (Investigating the ancient past) could be incorporated into this overview.

I would then recommend Ancient Egypt as the first depth study – it is always a winner with students and they love it! It would show a natural progression and link from the overview and allow students to consider different perspectives in history (e.g. different perspectives on the building of the pyramids) as well as comparisons with other civilisations.

The second depth study could then be either Greece or Rome. The content and elaborations are similar between Ancient Egypt and Greece or Rome and provides the themes that are important as the basis of Western civilisation. All of these civilisations provide the framework in a chronological way (following on from the primary years model) and gives all students a basis to have a broader experience if they would like to continue the study of Ancient History in Years 11 and 12. The current curriculum only provides them with limited possibilities.

The third depth study can remain as is – however, it would appear that China is the more popular of the two Asian countries. There are certainly more resources available for China as well. One could then finish the year with a review – a comparison of the great civilisations. Why just study each civilisation in isolation? Why not look at the strengths and issues, technological developments, reasons for collapse across all the studied civilisations so that similarities and comparisons can be made? One could look back at ‘What is Civilisation?’ and ask the big questions even linking the ancient world to today’s world. Reduce the time and content and fit this year’s content into four topic areas of 25 per cent of time each.

The content elaborations and the historical skills elaborations are well integrated and have unpacked the issues of the civilisations, using good examples for teachers to follow.

In summation, I would recommend more of a survey and depth approach with the study of history being in context with the overarching theme for each year. I do believe that there are important aspects of each year's content that should form the foundation of the 'grand narrative' and that allow students to enter the 'conversation' by providing them with a scope and sequence that makes sense, chronologically and thematically. The overarching theme of the Ancient World for Year 7 is a sound one – the content is there but it just needs re-tweaking and rearranging to provide the links to make it tighter in structure and in coherence. It does mean a reduction in some choices but the benefits of broader exposure to ancient civilisations and providing the only time to experience the ancient world if they want to choose Ancient History in the senior course are worth it.

Year 8 – The Ancient to the Modern World

The first thing that stands out about the Year 8 course is the huge amount of content. The other is the broad choices offered with no mandatory content except the overview. This could mean that some of the most important influences on our society could be completely ignored if teachers decide to select topics which may be interesting, possibly 'obscure and ephemeral' but do not give the overall 'grand narrative'.

This is a year's content that I would recommend revamping. There are some alternatives in the depth studies (e.g. Angkor/Khmer Empire and the Polynesian expansion across the Pacific) that may be of particular interest to particular interest groups in some areas but would not be universally adopted, let alone be resourced adequately. There does not appear to be an overarching theme across the content for this year and could be seen as a tokenistic gesture to satisfy these interest groups. This is one occasion where the cross-curriculum priorities, particularly Australia's engagement with Asia, have had a negative impact on the decisions of what should be incorporated into the content.

There are no issues with the overview for Year 8. It is good to have that snapshot of what would be studied and the context in which the depth studies fit into the progression from Ancient World to Modern World. As far as depth studies are concerned, choice should still be allowed but there should be less choice in them. In fact, this may be a year where there should be some mandatory topics to fit in with the structure of other years. Some recommendations:

- The Vikings could be subsumed into the overview.
- *The Western World: Medieval Europe* could be the first core depth study, incorporating the Black Death into the study and allowing more time.
- *The Western and Islamic World: Renaissance Italy and The Ottoman Empire* could be the second core depth study (more survey than depth).
- *Expansion and Contact History* can then be used as the third depth study with choices: Japan under the Shoguns OR The Spanish Conquest of the Americas OR Mongol Expansion OR Aboriginal and Indigenous Peoples, Colonisation and Contact History.

This means that there would be mandatory core areas of study allowing survey and depth of topics with key people, events and issues being examined. It still flows with the chronological approach and has an overarching theme emphasising Western influence with the development of expansion and contact with other societies and influences. In the existing curriculum, as indicated previously, students may never have access to these key themes, issues, values and cultures of the Western world.

This may challenge the cross-curriculum priorities of the Asian perspective in this year (except for the choices of Japan under the Shoguns and Mongol expansion). It would also bring up the view that this becomes a Western-centred curriculum in this year – but there is a more logical progression and links in the delivery of the topics.

Again, the content elaborations and the historical skills elaborations are well integrated and they have unpacked the issues of the societies, using good examples for teachers to follow. There is good development of the concepts that are integrated into both the content elaborations and the elaborations used in the historical skills. By reworking the depth studies, it would allow for the skills to be developed in a more logical way rather than jumping from issue to issue without seeing the connections. Again, reduce the time and content and fit this year's content into four topic areas of 25 per cent of time.

Year 9 – The Making of the Modern World

I understand the attempt to have the overview of understanding the key concepts and issues that emerged in the world, and Australia's role within that context, but there are some major concerns.

The issues of the Industrial Revolution, the Progressive ideas and movements and, to a lesser extent, the Movement of Peoples were usually taught in the initial year of the Modern History course (usually Year 11) and the concepts were difficult for students to understand then. Placing them in Year 9 is a bold step as students at their stage of development struggle with these concepts, unless they are simplified. It is also at the ages when students find it most difficult to remain focused and having to study such abstract ideas is a serious challenge – let alone that it may not be interesting and stimulating! These issues could not be taught to the depth of what some of the elaborations expect. As well, this could be seen as a doubling up of the content in the Modern History senior syllabus as the introduction to the 20th century.

This would be an excellent opportunity to have the first depth study examining the issues and ideas in the world at the turn of the 20th century. An overview of some of these issues (Industrial Revolution and Movement of Peoples) could be incorporated into a broader range of themes: Gold Rushes, revolts, revolutions, wars and civil wars, the emergence of militarism, challenges to religion, challenges to the accepted order of monarchs and privileged societies. Themes that can be incorporated into key events – e.g. American Civil War, Meiji Restoration, Russo-Japanese War, Depression of 1890.

This could set up some of the themes emerging at the end of the 19th century in a more interesting way – the role of people, events and issues rather than the difficult 'isms' as prescribed in the current curriculum. This would give a broader perspective around the world, including the

acquisition of colonies in Africa and Asia, the response by Japan and China, the emergence of alliances, economic rivalries, naval rivalries and the emergence of new technologies (the machine gun, the airplane, medical improvements) and reduce the amount of content.

For the rest of the course, there could be a particular emphasis on Australia. The second depth study of 'Australia in Asia' as a core topic area could incorporate both alternate existing elements of Asia and the world and the Making a Nation and reduce some of the themes. It would hold true to the cross-curriculum priorities. It provides more of a link – world overview, regional overview and Australia with its emergence as a nation in WWI. Reduce the time and content and fit this year's content into four topic areas of 25 per cent of time.

Again, this is another occasion where the cross-curriculum priorities could be perceived to have had a negative impact on the decisions of what should be incorporated into the content. It is a little contrived to have the history of an Asian society OR Australia as the second depth study – there is no logical reason for inserting this perspective in what should be a study of Australia's entry into the world as a nation. Again, the content elaborations and the historical skills elaborations are well integrated and they have unpacked the issues of the topic areas, using good examples for teachers to follow. This is a challenging year in both content and concepts. However, with adjustments to the way in which the content is organised and structured, it is manageable.

Australians at War in World War I should remain as the third depth study. It reinforces the memory of the traditions of Anzac, now that we are approaching the 100th anniversary of Gallipoli, the first time that Australia served as a nation.

Year 10 – The Modern World and Australia

The overview for Year 10 is the logical and chronological way ahead in linking the events of WWI at the end of Year 9 with that of WWII and sets up Australia's role in the 20th century. However, I would recommend considering a more radical way ahead in the organisation of content by adding a dimension to the topics already there. However, the amount of time spent in the study of each topic would need reducing.

The study of Australia's involvement in WWII is the logical progression chronologically and thematically. One would just need to be careful not to overemphasise the issue 'wars' as there are other issues to consider. Therefore, I would recommend combining the overview with the first depth study of World War II with approximately 25 per cent of the total teaching time for the year.

I would also have the mandatory second depth study of Rights and Freedoms allocated the same teaching time of 25 per cent.

The third depth study of the Globalising World has three electives which are not as demanding in content as that which has been offered in earlier years. There is a sense of 'warm and fuzzy' about some of the topics where there is not the same rigour in some. The topic of the Environmental movement (1960s – present) could be removed and placed in the geography curriculum. The choice of either Popular culture (1945 – present) or Migration experiences (1945 – present) could then be allocated the same teaching time of 25 per cent.

What I would really recommend would be the inclusion of a rigorous unit to finish off the Foundation to Year 10 curriculum where students and teachers could tackle some really interesting historical debates or controversies. If we want students to continue on with either Ancient History or Modern History in senior secondary, there has to be enough rigour and interest in a topic of their own choice that gives students the opportunity to investigate and really get their teeth into using the knowledge and skills that they have learned over the years. The NSW History Kindergarten to Year 10 Syllabus (2012) has an interesting depth study to conclude their syllabus – a school-developed topic drawn from the content presented in the Year 10 overview or an interest topic from any of the other depth studies. For students really interested in what the study of history is all about, this would be a wonderful way to finish the compulsory years of schooling, finding satisfaction and a sense of empowerment in the development and presentation of an investigation of their own choosing³. It would also prepare them for the rigours of the Ancient and/or Modern History courses. This could also be allocated 25 per cent of the time.

Summary of analysis and evaluation of history's content descriptions and elaborations:

Years 7 to 10

There is a lot of content in the existing curriculum – and can teachers do all of this within the time they have been allocated? There is academic rigour – but there may need to be a rethink as to what essential body of knowledge should be taught or provide the links and connections between the depth studies. I recommend the need to have more of a 'core curriculum' in the Years 7 to 10 syllabus that everyone should have access to. Sometimes we have to compel students into the experience so that they do get the understanding of what has contributed to the makeup of the 'grand narrative' of the nation. However, there has to be enough choice and variety for students to do historical investigations without feeling they are restricted to mandated topics. It is good to have choice but possibly a reduction in the number of choices for some topics, except in Year 10 where the rigour of a school-developed topic, with a vast array of choice of topics, would improve the rigour of the whole curriculum while at the same time encouraging a love of learning and a quest for understanding the past, fostering the intellectual, social and moral development of students with its different perspectives and interpretations.

Too much content means that there is limited scope for teachers to encourage independent learning, to improve modes and methods of assessment, historical literacy, as well as providing more effectively for different groups. I would prefer to see options and opportunities for teachers to explore more creative and innovative ways in presenting historical information. There is not the same scope in this secondary curriculum compared to the primary curriculum within each of the content elaborations for different modes of assessment – there is more of an emphasis on 'describing', 'explaining', 'investigating', 'outlining' and 'recognising', all of which are not clear indicators for teachers for assessment or suggestions for different modes of assessment. Teachers would have to take the skills from the historical skills and incorporate them into the content elaborations for each topic.

³ NSW Board of Studies (2012). NSW Syllabus for the Australian Curriculum: History K-10 Syllabus. Refer to: <http://syllabus.bos.nsw.edu.au/hsie/history-k10/>

The general capabilities and the cross-curriculum priorities are more contrived in Years 7 to 10 as the topics and skills become more detailed and sophisticated. In fact, it appears that they may have compromised the way these years have been put together as they may have influenced the way in which the overall structure of the syllabus came together as the syllabus writers tried to maintain the integrity of their brief.

There is a balance in the information being investigated – so long as there is a deeper understanding of the Aboriginal and/or Torres Strait Islander peoples, of their history and culture. We don't want it to be tokenistic – if this issue is to be studied, it should be done in the same manner as all the other topics, with depth, empathy and perspective. If we want students to investigate 'within a particular historical context to facilitate an understanding of the past and to provide a focus for historical inquiries', then we need to provide opportunities for teachers to present alternate, even conflicting, responses to certain issues, even in the early years of education. If historians argue over interpretation of events, so we need to provide opportunities for students to be able to ask questions and come up with their points of view based on the evidence provided or investigated.

There are grand traditions that should be honoured and preserved – it is important to ensure that these are never lost; but not at the expense of new ideas, perspectives and interpretations. These need to be encouraged and given voice as well. The examination of different cultures and societies opens up a broader perspective than simply the time-honoured ways. It is all about balance, to monitor and oversee the structure and direction of the curriculum, to protect the interests of what should be taught but to be accountable to the community.

The Australian Curriculum – Senior Secondary – Ancient and Modern History

The Ancient History and Modern History curriculum continues to develop the historical skills and understandings taught in the Foundation to Year 10 history curriculum. The same structure is evident in both – the development of the Rationale, Aims and Organisation are appropriate to the demands of these courses. The inclusion of the representation of general capabilities and the cross-curriculum priorities are there to reflect the foundations on which each syllabus was developed but do not have icons attached to the particular units. This is probably sound – but the inclusion of them, with detailed explanation, does appear to be tokenistic.

Again, as in the Foundation to Year 10 documents, the strengths are in the detail. The historical skills are appropriate to the more sophisticated and complex content and cognitive development of the students and the way the Historical Knowledge and Understanding have the same themes developed in each option of the four units is impressive. These have been well devised and constructed. Whatever options are studied, the key issues are comparable. Again, there have been a number of consultations with feedback from a number of key interest groups involving representatives from a wide range of schools, associations and jurisdictions. In examining the content topics, there has been a significant amount of time, effort and involvement of specialist educators and practitioners of history.

The one noticeable change is that there are no overarching key inquiry questions for these courses – I recommend these should be developed at the beginning of each unit as they give teachers an overview of what each unit aims to achieve and underpins the rationale, aims and learning

outcomes that are unique to the study of history, ancient or modern, as well as guiding the process of historical inquiry to ensure that students continue to develop the skills of historical thinking.

Ancient History - Analysis and evaluation

What I like about the Ancient History course is the way in which the four units have been developed in a conceptualised manner, as a holistic study of the ancient past that is constructed from textual, visual and archaeological sources of evidence. There is also plenty of choice – and at this stage of students' education, it is good to see that there is no mandatory selection but that there are still requirements to study TWO areas in most units, giving breadth but also time for depth.

Unit 1: Investigating the Ancient World

With the start of a new course, I would recommend that it is important to start with an overview of 'What is History?' or in this case, 'What is Ancient History?' to guide the students – and here, an inquiry question such as 'What methods do historians and archaeologists use to find out about the past?' would be useful. It is good to start this course with a study of the broad methodology and theoretical aspects as the foundation for the subject.

The content of the unit is well developed under thematic headings and it appears to be comparable between different options. Of course, one would never be able to achieve exact comparability as there is more historical evidence in some of the areas than others but there is a consistency applied. This could also be used as a source-based assessment task to reinforce the skills acquired from Foundation to Year 10 and then into Year 11 where they identify, locate and organise relevant information from a range of primary and secondary sources.

Unit 2: Ancient Societies

Again, well developed and articulated. There is a requirement to examine the evidence of the social, political and economic institutions and structures of two societies (breadth and depth) and one significant feature of the society, each of which is unpacked significantly.

Unit 3: People, Power and Authority

Love the title, the development and explanation of the topic, linking one personality to a society. Most would study an individual from the society undertaken demonstrating the appropriate links. There are great themes, well developed and unpacked. Again, there appears to be comparability. The unpacking of each of the societies is similar in structure as are the general characteristics to be examined about each personality.

Unit 4: Reconstructing the Ancient World

An examination of a significant historical period means that students can study in depth. Some periods of time are longer than others but there are clear reasons for the dates. The headings for each period again give both students and teachers the ability to ask the 'big questions' when it comes to studying the ancient past – and a great way to finish the course.

Achievement standards Units 1, 2, 3 and 4

A sound matrix of 1) knowledge and understanding and 2) skills, that fit in well with expected outcomes of the students.

In summary, this is a well-designed course with plenty of scope, variety but a focus on the key issues facing the study of Ancient History. A core study, even with options, for all students undertaking the study of Ancient History could be used for a source-based assessment.

Modern History - Analysis and evaluation

There is comparability with the Ancient History course in the way in which the four units have been developed in a conceptualised manner, as a holistic study of the modern past. However, I contend there are some real issues with this course. There is plenty of choice, however, giving breadth but also time for depth in the topics.

Unit 1: Understanding the Modern World

With the start of a new course, I would recommend that it is important to start with an overview of 'What is History?' or in this case, 'What is Modern History?' to guide the students – and here, inquiry questions such as 'What sources do historians use to investigate the past?' and 'How useful and reliable are these sources for evidence?' would be useful. It is good to start this course with a study of the broad methodology and theoretical aspects as the foundation for the subject.

The content of the unit is well developed under thematic headings and it appears to be comparable between different options. However, I would recommend that only ONE of these topic electives be studied and have the mandatory topic of the Impact of World War I included. This event was THE major development and turning point for the start of the 20th century.

The study of World War I could then be used as a source-based topic to assess the skills of how historians identify the origin, purpose and context of historical sources, frame questions for inquiry and evaluate the reliability, usefulness and contestable nature of sources to develop informed judgements to support their arguments.

Unit 2: Movements for Change in the 20th Century

While many may find the topics on offer attractive, there is a concern about whether there is broad appeal for a number of these topics. If there is a reduction in the choices in Unit 1 as suggested above, there could be a case to incorporate more of the 19th century background of each movement.

There is also some concern about the sequencing of this unit within a teaching program as the topics currently stand and with tweaking could become more engaging. I can foresee that the topic of the Civil Rights Movement in the USA will be very popular whereas the others are particularly dry and uninspiring. I recommend that the suggestion of a more engaging topic, such as the Terrorism topic originally included, would be more engaging and relevant to the study of the modern world as an alternative.

Unit 3: Modern Nations in the 20th Century

While I strongly agree with the decision to study TWO national studies, including one from Asia, there will be large time constraints to study both nations effectively in depth as well as looking at the role the impact of significant individuals. The other concern is the comparability between some of the topics – some are huge in content and others are less engaging.

The study of World War I is imperative in Unit 1 as all the nations in List 1 start at the end of World War I. There needs to be a link in the syllabus design for students to understand the links between what changed the world and its impact on the nations offered in List 1. The other interesting feature is that World War II is a topic that encompasses all of the national studies except one (India). If World War II was made into a topic, it could be used as a core topic area as it is a potentially huge topic in itself in each study.

The study of Australia at this level is problematical – it was incorporated in the NSW Modern History syllabus with relatively few studying this option and was the least popular option. This topic means there will be some repetition and overlap of what had been covered in Year 10. There has been a concentration on Australian history throughout Foundation to Year 10 and one could argue that it has been included here in a tokenistic manner to support the notion that we need to understand our own country better than we do. This would not be a popular option.

Unit 4: The Modern World since 1945

There are six topics listed and all of them are highly relevant and engaging in different ways with different focuses. There is a broad range of topics for students and teachers to choose from and in a way it is a pity that only one is to be selected – the time frame of around sixty-five years prohibits the study of two topics as the issues do need fleshing out and it means that there is more of a survey and depth approach to this unit. It is also a good way to finish the course with relevant and interesting themes to explore and develop and relate to how they have impacted current events.

Achievement standards Units 1, 2, 3 and 4

A sound matrix of 1) knowledge and understanding and 2) skills, that fit in well with expected outcomes of the students.

In summary, while there are obvious connections in the way the Ancient History course and the Modern History course have been designed, the Modern History course does not fit as well. While it attempts to look thematically at the issues of Modern History, the chronological connections are not there. The course assumes that there is knowledge of particular issues (such as the impact of World War I and World War II) but I recommend this course needs a good revamp. A core study, in both Units 1 and 3, may overcome this to be used for a source-based assessment demonstrating the skills that students have learned.

Conclusion

In separating out the syllabi into different parts, it has been easier to see the logical progression from year to year, from course (Foundation – Year 10) to course (Senior History: Ancient and Modern History). In conducting this review, I contend that the development of the history curriculum has been done with a high degree of independence and balance, have stayed true to the protocols set out in the Melbourne Declaration and have been true to the *Australian Curriculum Shaping Paper*. There has been input of teachers and educators across states and territories (with all of their own agendas), and it is evident that the History Associations have been involved throughout the process, to ensure that a viable curriculum has been developed. There has also been wide representation and feedback from all key stakeholders, including teachers, principals, governments, state and territory curriculum authorities, professional education associations and parents as well as

feedback on drafts and editions through formal submissions as well as key personnel involved in writing, trialling and reviewing. Consultation has been lengthy and has resulted in numerous drafts, modifications and versions to create what is an engaging, well-developed, flexible and balanced curriculum.

It is a robust curriculum – there are plenty of challenging topics and a significant development of historical skills expected of students. There is a structure to the whole Foundation to Year 12 curriculum, a logical progression in skills and achievement levels and the organisation of the historical content and skills reflects the developmental stages of students. There is a breadth of information that gives a breadth of understanding, is not narrow in scope but exposes students to the world at large and Australia's role in it.

There is no ad hoc manner in the way the content and structure has been organised – in fact there has been an attempt to avoid repetition of content. There is choice: a combination of mandatory and options available in depth studies (Years 7 to 12). This gives the opportunity for students to engage in topics of their interest, reflects the diversity within the different states and territories of Australia and provides flexibility in schools to explore depth studies that interest them.

There are issues though – the time allocated to the study of history in each state and territory by curriculum authorities in an already crowded curriculum makes the integrity of all that is the curriculum, both knowledge and understanding and historical skills, problematic.

The charge that this curriculum is 'left wing' or even 'right wing' is unsustainable – there are enough responses to these criticisms to counter these claims. There has been no skewing of the history curriculum towards one political perspective or another – there was a review by an independent party in the process of consultation that occurred in the development of the curriculum.

However, I am challenging the current use of limited mandatory units in the Years 7 to 10 syllabus to that of only WWI, WWII and Rights and Freedoms. One would not like to add any more topics to an already crowded curriculum (as stated a few times now) and without restricting choice to allow flexibility and interest. However, who determines what is the 'core curriculum' that needs preserving? This is always a difficult challenge as charges of bias for particular cultural or philosophical reasons come into play. Whose 'grand narrative' and 'great traditions' should be included, worthy of preserving, worthy of value, without the challenge to the validity of the choices of what has been selected to be included but at the same time allowing the other voices in the conversation of the past, the divergent voices?

Without having access to all the other documentation for each of the key learning areas covered by the Australian Curriculum, my only other comment would be to encourage an examination of the history curriculum in terms of where some aspects could be better suited (sustainability, for example, in geography). There is always the danger of overlap between the different subject areas that one may not be aware of when just focusing on the history curriculum.

Part B: Benchmarking against two other relevant countries

1) England

Australia appears to be following the well-worn path of England in establishing a National Curriculum. The UK commenced their journey into the development of a National Curriculum following the Education Reform Act (1988). Since then, there has been a moving of the 'goalposts', usually associated with changes in the political makeup of the country, with revisions to their National Curriculum plus a myriad of literacy and numeracy initiatives introduced along the way. The latest rendition is formulated around The National Curriculum in England Framework Document (September 2013).

England's professionally-designed history curriculum has been left reasonably intact. The other interesting feature to note is that academies have a significant degree of autonomy in deviating from the National Curriculum in England. It appears that there is a great amount of flexibility and choice at the local level.

In spite of the attempt to have history compulsory beyond Stage 3 (14 years of age), this has not occurred. The falloff in numbers of students studying history for the Graduate Certificate in Secondary Education and A levels in England has been alarming, possibly a contributing factor to what students have studied in the mandatory years in the history syllabus or the way it has been taught.

There are a number of similarities with the Australian Curriculum – the overarching principles in the Preamble of the Melbourne Declaration are very similar to what has been expressed in point 2 of the full national curriculum framework document for Key Stages 1 to 4 in England⁴ where:

'every state-funded school must offer a curriculum which is balanced and broadly based and which:

- *promotes the spiritual, moral, cultural, mental and physical development of pupils at the school and of society, and*
- *prepares pupils at the school for the opportunities, responsibilities and experiences of later life.'*

The structure of the English National Curriculum has a major focus on the 'Core subjects' of English, mathematics and science with history being one of nine 'Foundation subjects' for Key Stages 1, 2 and 3 (ages 5-14, Years 1-9). Australia's Curriculum: History, in comparison, sees history as a core component with English, Mathematics and Science and has a greater scope (adding two extra years: Foundation and Year 10). There are also statements about numeracy and mathematics and language and literacy as being 'a precondition of success' and 'an essential foundation for success' in all subjects across the curriculum.

There is a heavy emphasis on the 'introduction to the essential knowledge that they need to be educated citizens ... and helps engender an appreciation of human creativity and achievement'. In

⁴ UK Department of Education. Statutory guidance - National curriculum in England: framework for key stages 1 to 4. Can be accessed at: <https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4>

the Aims of the National Curriculum in England, it emphasises ‘the national curriculum provides an outline of core knowledge around which teachers can develop exciting and stimulating lessons to promote the development of pupils’ knowledge, understanding and skills as part of the wider school curriculum.’ This is their version of the general capabilities across the curriculum. They are limited in scope compared to the seven capabilities embedded in the Australian Curriculum and most of the others not directly referred to are inferred in the documents. There is no mention of cross-curriculum priorities. This is a real advantage of the Australian Curriculum as it gives teachers, students and parents the overarching rationale of what is expected of students, better than the English version, so long as it is not tokenistic.

There is a very detailed program for English, mathematics and science in the English curriculum. ‘The Secretary of State for Education is required to publish programs of study for each national curriculum subject, setting out the “matters, skills and processes” to be taught at each stage level.’ This is not available for history. However, in examining the English, mathematics and science elaborations, they are very prescriptive with ‘Programs of Study and Attainment targets’ with areas where ‘pupils should be taught to ...’ in each year of each stage level. It is very prescriptive and heavily mandated although schools are free to choose how they organise their school day, ‘as long as the content of the national curriculum programs of study is taught to all pupils.’ There appears to be a heavy emphasis on the content of each of the subjects and not as much on the skills that are incorporated into the Australian Curriculum documents.

For the history curriculum, there is a large amount of similarity between the Rationale and Aims (Australian Curriculum [AUS]) with the Purpose of Study and Aims (English Curriculum [ENG]). I have already indicated that I prefer the English version – some of the terminology is far more attuned to historical skills and literacy (e.g. ‘sift arguments’, ‘develop perspective and judgment’).

In examining the English curriculum, it is interesting that the final version has changed quite significantly from its original version and is similar in nature to that of the Australian version. There is a progression from ‘changes within living memory’ (ENG) taught in Key Stage 1 (similar to Awareness of family history and community heritage (AUS) in Foundation to Year 2) to more emphasis given to world history alongside the mainly British focus (‘develop a chronologically secure knowledge and understanding of British, local and world history’ Key Stage 2 ENG) paralleling the local/national history and use of a range of sources curriculum focus of Years 3-6. I believe that the Australian historical knowledge and understanding scope and sequence give a far better overview in the continuum of learning.

A number of the key historical skills that are unpacked in the Australian history document are referred to the UK subject content areas, however the Australian document is far more impressive in the way that it reflects the matrix of the skills in the historical skills scope and sequence, the development and continuum of the skills in conjunction with the topic areas. The English curriculum’s compulsory content has also been drastically stripped back, with detailed bullet points that were previously listed as mandatory now presented as suggestions. Both documents interestingly enough now have (for example...) as indicators of what could be examined.

In Key Stage 2 (for 7-11 year olds) and Key Stage 3 (ages 11-14), English students have to study a world history topic and local history alongside British topics. At Key Stage 2, a world history topic is required, including the possibility of studying early Islamic civilisation or the culture of Benin in West Africa while the Crusades is studied at Key Stage 3. There is both a chronological approach as well as a thematic approach with 1066 being the cut off for study before students go to high school.

What emerges is more of an overview of the study of history in England rather than a prescriptive program to follow and allows for flexibility and local interests (particularly with the inclusion of a local history study in both Key Stages 2 and 3). There is still predominance on British history, although not as much as before, with a distinct push to link local and national history into the broader world history context with less mandated and prescriptive detail. This would make the curriculum far more appealing and relevant to the needs of students. There were comments that if this had not been changed that the curriculum risked making students disenchanted with education. They also have the distinct advantage geographically being so close to the rest of Europe.

To examine one content area that is common in both curriculums, it helps to understand the different approaches that each undertakes. In Key Stage 3 (ENG), the first topic area focuses on the development of Church, state and society in Medieval Britain 1066-1509. The Year 8 (AUS) option (not mandatory) is Medieval Europe c. 590 – c. 1500. In the English topic, there are examples that could include a number of areas – this leans toward the combining of overview and depth in this study to assist students understand the development and complexities of the various aspects of the content. There is no prescription of content. There is an emphasis on the chronology of the knowledge and understanding of British, local and world history and the skills to be assessed are listed in the beginning of the description for Key Stage 3 but the way in which this would be done is left to the teacher, encouraging flexibility and creativity.

In the Australian version, there is a different approach. In the Year 8 introduction, the key concepts are reinforced, there is emphasis on the links between historical knowledge and understanding with that of the historical skills and there are key inquiry questions. When one examines the optional topic of Medieval Europe, there are key issues to be developed and each is unpacked to assist teachers in the way it could be taught. There is a greater time period and is more of a survey approach but allows for depth in some of the dot points. It is more prescriptive in covering all the areas rather than what could be included in the study. There is emphasis on contact with other civilisations and the social, economic, religious and political beliefs that were challenged and significantly changed as a result. However, this is an option in the current curriculum (although challenged) and not studied by everyone.

The study of Ancient History in the English curriculum is listed in two dot points at the end of Stage 2 as part of the world history content. The majority of the content for the stage deals with British national history. It is included to satisfy the context of world history – the achievements of the earliest civilisations with an overview and a depth study of one civilization is required but there are no suggestions and elaborations in any of the topics to be studied as ‘world history’ in either Stage 2 or 3. Ancient Greece is the other dot point – ‘a study of Greek life and achievements and their

influence on the western world.’ It is so broad and is included as a survey – no attempt has been made to set this in a chronological way or to show connections with the rest of the topics.

The Australian version treats each topic in exactly the same way – there are parallels between options and there is a perceived view that each topic is as important as any other. There is an overarching overview to place all the topics in the context in which they are being studied – a far more thoughtful approach with a rationale that underpins the reason for why these topics are being studied. It could be argued that the English curriculum is so less mandated that it allows teachers to organise the structure of their programs over the years in the way they want to do it compared to the rather more mandated approach of the Australian version which does not allow as much flexibility.

Overall, there is a much more open curriculum in England as teachers have the opportunity to develop their own approach to the way the content is taught around the three concepts of national, local and world history. However, there are not many direct connections between these three strands and with Key Stage 2 covering four years of education at the end of primary school and with Key Stage 3 over the first three years of students in high school, it could mean that different students study different topics at different times over those years. If students move from school to school, it may mean that they miss topics or repeat some of them.

In the Australian version, there is more rigidity as to when topics are taught – they are fairly restricted to certain times within a year therefore avoiding replication or missing topics if students move to other jurisdictions or states and territories. However, with the choices that are on offer, it means that different students could study different topics and there may not be a common core curriculum that is offered. In NSW, for example, the syllabus for Stage 5 (Years 9 and 10) has the flexibility to incorporate the study of WWI and WWII in a combined study thus allowing the development of their own school-developed topic in Year 10 – anyone moving from other jurisdictions may find this out of step with what they had experienced.

One could infer that there is more of a push towards the English system wanting to teach the content, the ‘facts’ of the period whereas there appears to be more of a combined emphasis of both knowledge and skills in the Australian Curriculum. There is more of an emphasis on the balance between British, local and world history in the English curriculum with mandated topic areas (with flexibility in what could be incorporated into what is taught within each topic) whereas the Australian version has an emphasis on the overview and then choice of topic areas that are not predominantly mandated but the topic chosen has mandated curriculum content (with examples to assist teachers if they require it).

Is one system better than the other? The English National Curriculum has been through many renditions and they have finally settled on what they believe is the right way forward that maintains the integrity and robustness of the standards expected. The Australian version is in its initial rendition and is content-heavy and broader in scope than its English counterpart with two extra years in which history is taught. The English curriculum allows topics, with flexibility, while the Australian version allows choice of topics with mandated content within each topic. Both have been generated by input from professionals and educators and have resisted the input of politicians to

influence the shaping of the curriculum. Both curricula have emphasis on securing knowledge and understanding of their national history, local and world history but focus on these aspects in a different model and structure, the Australian version more thematically separated while the English version focuses on these issues concurrently. The English version has a concentration on the younger years to age fourteen whereas the Australian version goes beyond that to age sixteen, hence the development of more content and more sophisticated skills relating to the developmental stages of students and are age appropriate throughout all years for the cognitive development of students.

2) Singapore

The Primary Social Studies Syllabus incorporates the study of history within a Social studies framework. 'The curriculum aspires towards the educative growth of the Social studies learner as an informed, concerned and participative citizen at the end of a full course of Social Studies education,' a strong emphasis on the individual's role within the island state of Singapore. There are obviously differences in examining Singapore's curriculum as their particular needs tend to focus more on the role of citizenship, the cultural diversity of Singapore, the economic dependence on sustainable living, the resourcefulness of the community and the dependence on economic connections with the world. This syllabus has only recently been implemented in 2012.

From an historical perspective, the Singapore Primary syllabus is organised in clusters of study every two years and there is a progression from 'Discovering Self and Immediate Environment' to Understanding Singapore in the Past and Present' to Appreciating the World and the Region We Live In.' This appears to be very similar to that of the Australian version and there is a strong connection of outcomes for students between knowledge, skills and values. There is a strong emphasis listed in the syllabus for teaching and learning through inquiry and when one examines the assessment criteria, particularly with the performance tasks, one notes how mandated the activities could be as there is strong pressure to maintain their educational ranking in the world through testing. However, it is encouraging to see that problem-solving skills and inquiry figure prominently in the syllabus. There is no overall overarching philosophy expressed in this syllabus that shows the links with the continuum of learning into high school so the perception is that this is a stand-alone curriculum.

There is a strong connection with both the Australian and English curricula when the content areas are examined. The Level Descriptor highlights the relevance of what is being examined with an Inquiry Focus and Guiding Questions, similar to the key inquiry questions of the Australian Curriculum, with links between the Knowledge Outcomes, Skills Outcomes, Values Outcomes and key concepts. This correlates quite well with the Australian Curriculum as the knowledge and understandings of each topic are unpacked from the guiding questions. In structure, therefore, there is a strong correlation between the Singapore Primary Curriculum and the Australian Curriculum - Foundation to Year 6. The Suggested Learning Activities incorporated into each year level and the Suggested Performance Tasks form Years 3-6 are directed to an inquiry approach for students, a strong emphasis on developing critical thinking skills and the use of ICT in sparking engagement, curiosity and reflective thinking.

Social studies in Singapore is a non-examinable subject at the primary level. Assessment is, however, important to help monitor pupils' progress in their learning of social studies. To evaluate and

support pupils' learning, the use of a variety of assessment methods is encouraged. This subject does not contribute to the examinations used at the end of Year 6 for streaming students into high school for the following year. Because it is a social studies framework, there is not the same emphasis on the historical skills as that the Australian and English history curricula. There is a strong emphasis on what makes Singapore unique – it is directly related to their dependence on their economy and their importance in the region. There is a strong emphasis on the national history of Singapore with a limited view of how Singapore fits into world history – the context of Singapore within Southeast Asia is just as important but there is an examination in Primary Five in which there is a broader view of the whole world.

This Singapore Primary Social Studies Syllabus is therefore comparable with the Australian Curriculum Foundation to Year 6 in that there is a heavy focus on the awareness of identity and community heritage and a strong emphasis on local/national history. The main difference is the strong emphasis on the role of citizenship that the Singapore document embeds, more than that of any other curriculum, probably due to the broader nature of social studies than the unique study of history with a strong desire to address the 21st century competencies focusing on capacity building. The 21st century competencies are mapped across each of the years although there is not the same level of sophistication in the way these show progression from year to year as that of the Australian scope and sequence.

In Primary Five: Appreciating the World, there is a unit as an overview of the creativity and achievements from the civilisations of the Sumerians, the Egyptians, the Greeks and the Romans with 2 achievements listed only for each civilisation. This is then followed by the legacies of China and India and how they influence lives today – these areas are unpacked in far more detail for both China and India than that of the preceding civilisations. It could be perceived that there is more importance in studying national and regional history than the history of other regions in the world.

The History Syllabus: Lower Secondary has been implemented since 2006. This syllabus is better to review in order to compare and contrast with the curricula of Australia and England. There are two courses – Secondary 1 to 2 (Special/Express Course) and Secondary 1 to 2 (Normal Academic Course). The first noticeable emphasis in both these courses is how narrow the scope of the study of history in the lower secondary topics. Even though there is the stated intent to provide students with the fundamental historical concepts and skills required in the study of history and knowledge of the key developments and forces that shaped the past, the overwhelming emphasis is on Singapore and its place in the region. It is even explicitly stated in the values and attitudes 'to appreciate our cultural heritage ... to instill a sense of loyalty, pride and commitment to Singapore ... to promote an awareness of the influence of external events on Singapore and the interdependence of countries.' The content, with inquiry questions, are linked to the learning outcomes, the concepts and the values and attitudes in the syllabus document for each of the ten units.

There is no choice for students and teachers – it is a heavily mandated curriculum. The concept of 'inquiry-based learning through the use of sources' is referred to in the introduction but is not developed within the content and skills of the units. The units are thematic in structure and there is only scant reference to issues outside the region (and when they are referred to, they predominantly

are directly). The content and learning outcomes of Course 2 (the final topics studied) are dominated by the links to the economy and development of Singapore with the values and attitudes reinforcing expected behaviour from their citizens ('resilience, tolerance, mutual respect, loyalty, determination, diligence, self-reliance').

While assessment modes are encouraged, the formal assessment format reinforces the view that examinations and tests are the best way to evaluate how much students have learned. While 'oral presentations, project work and fieldtrip assignments, on the other hand, evaluates organisational, collaboration and communication skills', none of these contribute to the formal assessment.

Conclusion

Richard J Evans (2011) suggests, *'It is possible to teach actual skills only if history is taught in depth and that means a focus on a limited number of specialised topics. Of course, students need to know at least in outline the longer-term context of what they study. But if you make this context the core element in the curriculum, you are sacrificing depth for breadth, and you will end up with a superficial gallop through the centuries'*. Evans goes on to say, *'History is by its nature a critical, skeptical discipline. Historians commonly see one of their main tasks as puncturing myths, demolishing orthodoxies and exposing politically motivated narratives that advance spurious claims to objectivity'*.

This is what makes the formation of a national curriculum in history so controversial. Evans does not agree with Schama's return to 'storytelling in the classroom' but advocates that students should learn to be skeptical about the narratives presented by historians, 'including of course Schama's own account of British history'.

History thankfully is not a process by which accepted facts are delivered to pupils. One of the most common problems in assisting students to understand historical narrative and make judgments is the compulsion students feel to find the 'right answer', the most important facts, the one authoritative interpretation. Students need to be exposed to the view that historians differ on the facts they incorporate in the development of their narratives and disagree on how the facts have been interpreted. History is usually taken to mean what happened in the past; but written history is the dialogue among historians, not only about what happened but also about why and how events unfolded. It requires the evaluating of arguments and arriving at usable, even if tentative, conclusions on the available evidence. But to do this, what is required is a strong grounding in historical knowledge and understanding as well as the ability to question and critique different opinions.

Marwick (1970) suggests, *'It is only through knowledge of its history that a society can have knowledge of itself. As a man without memory and self-knowledge is a man adrift, so a society without memory (or more correctly without recollection) and self-knowledge would be a society adrift'*.

In contrast, Foner (2002) suggests, *'There is nothing unusual or sinister in the fact that each generation rewrites history to suit its own needs, or about disagreements within the profession and among the public at large about how history should be taught and studied ... History always has been*

and always will be regularly rewritten, in response to new questions, new information, new methodologies and new political, social and cultural imperatives ... But the most difficult truth for those outside the ranks of professional historians to accept is that there often exists more than one legitimate way of recounting past events'. Foner concludes with: 'Who owns history? Everyone and no one – which is why the study of the past is a constantly evolving, never-ending journey of discovery.'

It is a discipline in which pupils become aware of how historical accounts are constructed, the evidence upon which they are based, the motivations of those who construct accounts and the validity of those accounts in differing contexts. It is a discipline in which pupils make judgments and defend those judgments with evidence.

The current Australian Curriculum: History is strengthened by the ways in which the balance of knowledge and understanding, key concepts and skills has given the study of history in schools a sound disciplinary framework. These key concepts and skills have gained the approval of eminent academic historians. They are also familiar to many teachers, who have spent many years developing schemes of work and teaching approaches that have allowed pupils to show their understanding of history through these key concepts and skills.

The Australian Curriculum: History provides a balance of breadth of knowledge supported by the key concepts and skills to give pupils by the end of Year 10 an overview of local, national and international history. What lies at the root of all this is a profound division of opinion over what constitutes, or should constitute, national identity? What is required, and largely achieved in this curriculum, are rigour, flexibility and clarity, providing the fertile ground for ideas and debate. We need to provide students with the opportunity to develop skills to analyse, be creative, critical thinkers, be able to synthesise information, collaborate, problem-solve and communicate effectively – all this while being personally and socially responsible as an active citizen.

But this doesn't solve the problem of what should be taught, the 'distinction between the inessential and the indispensable'. I believe that the content base of the history curriculum should be broad and balanced, representing a sequential program that equips young people with a broad historical knowledge needed to make sense of their own place within Australia and Australia's position in the world today. There should be an emphasis on the 'big themes' of history – the development of democratic institutions and political power in Australia; changing relationships through time of the peoples and cultures that make up what it is to be 'Australian'; the impact of movement, settlement and contact; changing attitudes, beliefs, ideas and lives of people over time; and the development of trade, colonisation, industrialisation and technology.

At the same time, teachers require the freedom to develop programs suitable for the needs of their students, the needs of their school while ensuring a broader and more cohesive understanding of Australia, the region in which we live and the wider world, is taught. Substantive knowledge and understanding should be at the heart of the curriculum – given the nature of history, both in terms of its vastness and its contested and contentious nature, this reality is a remarkable achievement in the form it now appears and is a tribute to the authors of the various iterations of the Australian Curriculum: History.

Bibliography

Evans, Richard J. (2011). The Wonderfulness of Us: the Tory Interpretation of History, cited in London Review of Books. Retrieved from: <http://www.lrb.co.uk/v33/n06/richard-j-evans/the-wonderfulness-of-us>

Foner, Eric (2002). Who Owns History? Rethinking the past in a changing world. Hill and Wang, New York.

Marwick, Arthur, (1970). The Nature of History, Macmillan Press, New York.

National Curriculum in England: history programmes of study, found at: <https://www.gov.uk/government/publications/national-curriculum-in-england-history-programmes-of-study/national-curriculum-in-england-history-programmes-of-study> (Published September 2013).

Schama, Simon (2010). My vision for history in schools, The Guardian, Tuesday 9 November 2010, found at: <http://www.theguardian.com/education/2010/nov/09/future-history-schools>

9. Geography (Foundation to Year 12) – Mr Alan Hill

Executive Summary

If one is to accept that the three current cross-curriculum priorities represent the most valid foundation for a new, national approach to education, then the documents designed for geography offer teachers and their students suitable scope, balance and robustness in terms of content, general capabilities and achievement standards. They also strongly encourage flexibility in classroom delivery and provide appropriate levels of accountability in reporting mechanisms that appear sufficiently clear, logical, coherent and meaningful for most audiences. However, there are several measures that should be adopted to enhance the relevance of the document and many of these suggestions relate to a need to review some of its current emphases.

In terms of content, it is recommended that curriculum designers reinforce the two core strands of the subject – physical and human (cultural) geography, accept and employ the traditional terminology and strive to better represent the physical strand.

It is acknowledged that the highly prescriptive, detailed content descriptions and elaborations should be helpful for the burgeoning numbers of teachers who are non-geography specialists (including those in rural or isolated settings). On the other hand, it is vital to provide teachers with adequate time/opportunities to use content as a vehicle to give explicit instruction in creative and critical thinking skills as well as acquiring a basket of subject-specific skills. This may involve taking bold steps to reduce the volume of listed content or at the very least, modifying the expectations in terms of width of coverage. Nonetheless, raising the profile of thinking skills in Australian schools is seen as a matter of urgency. Transformational change will be accelerated if curriculum designers provide a model or recommend the adoption of a suitable framework, one noted for its simplicity and ease of execution.

Similarly, it should become a national priority to curb the spread of ‘nature deficit disorder’ in primary and secondary classrooms. While the new curriculum offers teachers opportunities to explore the outdoors in the earliest years, the importance of local fieldwork should be even more strongly advocated in the document (Foundation to Year 12) to address the increasing detachment youngsters feel towards their surrounding environment. Once again, geography teachers (especially non-specialists) would benefit from specific guidance on the basic principles of fieldwork and of suitable lines of geographical inquiry.

Surprise is expressed, indeed a little disappointment, that students are neither expected nor encouraged to investigate the political considerations of issues. While it is acknowledged in the document that there are economic, social and environmental dimensions to be explored, the reality is that most issues treated in geography classrooms are heavily underpinned by political causes and ramifications.

In conclusion, it would appear that geography has been chosen as the chief ‘flag bearer’ to promote sustainability, one of the three cross-curriculum priorities. The subject is admirably equipped to do so; indeed geography is uniquely positioned to fully appreciate the concept and should become a

compulsory component of any Australian Curriculum for that reason alone. Some reservations are expressed about the dangers of saturating our pedagogy with this concept. It is argued that for meaningful understanding to occur in any worthwhile exploration of an issue, students need to fully appreciate the physical/geomorphic processes involved and the human/cultural impacts, both positive and negative, before they can develop the confidence to make accurate judgements about sustainability.

Content

As a precursor to an analysis and evaluation of robustness, balance and scope, I wish to make the following observations:

- (i) Until the publication of this document, most respected geography courses were designed to expose students to learning from two core strands of the subject – physical and human (cultural) geography. It is noted, in a comparison of this curriculum with those of ‘two other relevant countries’ (i.e. the revised curricula for England and Singapore) that both have retained the traditional terminology and both strive for a balance of these units/topics, e.g. Singapore, upper secondary - three physical and three human topics (from the 8 listed, 4 options for each strand). As well, it would appear that this balance in content is reflected in the program of assessment. This is not the case in the new Australian Curriculum.

Physical geography makes an appearance in places but the physical processes of aggradation and degradation which create landforms/landscapes and wear them away/shape them appear to be ignored ... until Year 8 with the unit on ‘landforms and landscapes’. Students should be exposed to the forces of volcanism, plate tectonics, weathering, erosion, transportation and deposition during their primary years. For example, there are several references to ‘natural features’ (Years 1, 3), ‘environmental characteristics’ (Year 5), even the ‘influence of the environment on the human characteristics of a place’ (Year 5, content descriptions) but precious little space/time is given to the geomorphic/physical processes that create these environments. As a result, I express some concerns about the sequence of topics.

A further example relates to the teaching of those geomorphic processes which operate in a catchment. Students are required in Year 7 to complete the unit ‘Water in the world’ or select a possible case study called ‘Inland water’ or ‘Land’ in Year 10 (‘Environmental change and management’) and investigate the ‘environmental and economic’ factors that ‘influence crop yields in Australia’, presumably including the 40 per cent of our food produced in the Murray Darling Basin, without a foundational understanding of its physical geography.

In my opinion, we need to address the issue of balance in our curriculum and strive to better represent the physical strand of the subject. As well, I would strongly recommend that we retain/reinstate the traditional terminology and use them explicitly in the content descriptions and elaborations.

As is clearly stated, in the revised English geography curriculum:

‘As pupils progress, their growing knowledge about the world should help them to deepen their understanding of the interaction between physical and human processes, and of the formation and use of landscapes’ (Geography programs of study, National Curriculum of England: Key Stages 1 and 2, Sept. 2013, p.1)

The other surprising omissions from the list of themes treated in Years 8-12, but especially from Years 10 to 12 are:

- (a) any substantial reference to geopolitics (e.g. global conflicts over territory, resources, religion, ethnicity) or the geography of warfare/peace
- (b) food security and population pressure on resources - global, spatial inequalities in development
- (c) geography of disease.

Instead, the final unit in Year 12, entitled ‘Global transformations’ appears to adopt an unnecessarily narrow focus (i.e. economic geography) on various strands of globalisation (already covered as a unit in Year 9 ... as indeed is food security). For mine, the final unit in the subject needs to adopt a much broader geopolitical view and offer students opportunities to explore several avenues of investigation. Studies of global conflict, spatial inequalities in development and food security or the pressures of population on resources also provide vehicles for students to revisit and improve their mastery of the world map ... perhaps a fitting end to a course in geography?

- (ii) It would appear that the expectations for the teaching of content in the new Australian Curriculum are far more prescriptive than past documents or those reviewed from overseas.

In England, ‘schools are not required by law to teach the example content in [square brackets]’ (‘geography programs of study, Key Stages 1, 2, 3’, National Curriculum in England, Sept. 2013, p. 2). For the Singaporeans, they have made a concerted effort to reduce the content in the curriculum (in Upper Secondary, by cutting the number of topics from eight to six) to provide time for teachers to use the content as a vehicle to give explicit instruction in creative and critical thinking skills.

The prescriptive format we have adopted may well be the response of our curriculum designers to the growing paucity of student and practising teachers with a deep understanding of the subject. In my sphere, most are non-specialists and have a background in a social science (history, studies of society and environment) or physical education. If that is the case, I support the decision. The detailed prescription of content will, in my estimation, be of significant assistance to teachers in rural schools, many of whom are also non-specialists.

Even so, it is crucial that teachers are allowed time to explicitly address geography skills (including the vital thinking skills) and not feel overburdened by the sheer weight of expectation in completing the listed content.

In my view, the Singaporeans were right when they introduced their ‘Teach Less, Learn More’ policy (2006-2012) as ‘a call to teachers to be less dependent on the use of rote learning and to move away from teaching for tests and examinations’ (Tan, 2013).

By boldly reducing the content (in all subjects), time could be given to more student-centred pedagogies (like the acquisition of skills) which encourages youngsters to use their acquired knowledge to develop good habits of geographical inquiry.

My reading of the new Australian Curriculum: Geography would indicate that our courses are based on ‘Key inquiry questions’ and that teachers are strongly encouraged to utilise a host of specific geography skills in the various ‘elaborations’ and in the ‘Skills scope and sequence: Foundation to Year 10’ (p. 96). As well, these are organised and thoughtfully sequenced under each criterion e.g. ‘Observing, questioning and planning’, ‘Collecting, recording, evaluating and representing’ and so on. Nonetheless, to ensure that these skills were taught more effectively, the Singaporeans reduced their content, made their expectations of skill acquisition (especially, the development of creative and critical thinking e.g. ‘problem-solving, decision-making, judgment’) more explicit in the new learning platform and provided the time for teachers to deliver these outcomes. In my opinion, we would do well to adopt these strategies.

When it comes to the content of the learning area, as specified in the subject’s content descriptions and elaborations, I have few reservations about its robustness. Compared with current courses operating at my own school, there are a number of units appearing in the Foundation to Year 7 courses which are covered in our junior and senior secondary offerings. For example:

- | | | |
|--|----------|----------------|
| • Zoning (Land Use) | - Year 5 | (Years 11, 12) |
| • Place and Liveability | - Year 7 | (Years 11, 12) |
| • Major Climate Zones around the world | - Year 3 | (Years 11, 12) |
| • Weather and Climate | - Year 3 | (Year 10) |
| • Studies of Development | - Year 6 | (Years 11, 12) |

In terms of balance, it is pleasing to see the current emphases on locational knowledge and place knowledge throughout the primary years as increasing numbers of students have been reaching Year 8 with significant deficiencies in their grasp of this place-name geography. Similar emphases appear in both the new English and Singaporean curricula. However, I am surprised that there appears to be little time devoted in the Years 8 – 12 courses to such pursuits. Experience suggests that for learning of place-name geography to be effective (and therefore, more transferable to the units they are currently studying in these courses), students should be exposed to them in a ‘spiralling’ fashion i.e. on more than one occasion in a course extending from Foundation to Year 12. According to my reading of the document, the only time pupils study the locations of the major countries of Africa, South America (Year 4), Europe, North America (Year 5) and Asia (Year 6) occurs during the primary years.

I am pleased to see the earliest years (Foundation to Year 3) of a geography course giving teachers and their students a host of opportunities to explore the various themes associated with places. It should become a laudable, indeed a pressing objective, given the rampant spread of ‘nature deficit disorder’ in our classrooms (primary and secondary). While it is stated in the Australian Curriculum document (pp. 18, 19) that teachers are encouraged to find ways (through fieldwork, in print or digitally) to ‘develop a holistic understanding of human dependence on the environment’ and provide chances for students to ‘examine the effects of human activities on environments’, it is recommended that several of these experiences occur outside the classroom. The importance of local fieldwork should be even more strongly encouraged in the document (beginning in the Foundation year) as a means of addressing the increasing detachment youngsters feel towards their surrounding environment (and, in particular, to its natural components).

While I fully realise that ‘sustainability’ is a cross-curriculum priority and that a subject like geography offers a more convenient vehicle for such studies than mathematics or English, I would caution against its overuse as a concept. The reality of modern day print and visual media ensures that students encounter the term on a regular basis indeed, I would argue that geography courses are saturated with such language. This only serves to ‘devalue its currency’ and create barriers (‘I know all about this’ attitudes) for teachers to penetrate when broaching the subject (as experienced previously with their over-exposure to the concept of ‘climate change’). In such situations, it’s often best to present the information surrounding an issue and allow students sufficient thinking time to reach their own conclusions.

Finally, I remain satisfied that, apart from previous recommendations made about the need to better represent the physical strand of the subject, curriculum designers have provided a reasonably comprehensive balance of key concepts and skills. As well, I found that teachers have been given ample scope for choice (apart from the deficiencies in physical geography topics) and flexibility in the delivery of this curriculum.

General capabilities and achievement standards

General capabilities

There are certainly broad similarities between the general capabilities expressed in the new Australian Curriculum and those found in the curricula of Singapore (where they are referred to as ‘21st Century Skills’, Ministry of Education, 2010) and England. The differences appear to lie in the subtle variations in their emphases and these no doubt relate to differences in cultural perspectives and core values. In the case of Singapore their ‘greater emphasis on the acquisition of skills related to processes, such as problem-solving, decision-making, judgment and communication’ leads to two of their ‘desired student outcomes’; that is:

‘an active contributor who is able to work effectively in teams, exercises initiative, takes calculated risks, is innovative and strives for excellence ... discerning in judgment, thinks independently and critically, and communicates effectively’ (Tan, 2013).

By comparison, the language used in the representation of the general capabilities – critical and creative thinking in the Australian Curriculum (p. 10) appears far more tempered e.g. ‘As

independent and autonomous thinkers who seek explanations and value discovery, students turn creativity into action, apply new knowledge to identified gaps, and justify their action.’ In addition, the accents on fostering collaboration, working in teams and enhancing communication skills appear stronger in the Singaporean framework whereas our own document appears to emphasise the importance of ‘applying ethical standards to guide the use of digital representations of phenomena and statistics’ (p.10). Indeed, it is mentioned twice in the seven general capabilities.

Nonetheless, there are broad similarities between the two documents:

<u>Australia (G.C.)</u>	<u>Singapore (21st Century Skills)</u>
1. Literacy	1. Civic Literacy Skills
2. ICT capability	2. Information Literacy Skills
3. Critical and creative thinking	3. Critical Thinking and Problem-Solving Skills 4. Creativity and Innovation Skills
4. Intercultural understanding	5. Cross-Cultural Skills
5. Personal and social capability	6. Global Awareness Skills
6. Ethical understanding	7. Communication and Collaboration Skills
7. Numeracy	

In conclusion, there is ample evidence through the Australian Curriculum, from Foundation – Year 12, of countless opportunities where teachers and their students can embrace the seven general capabilities through the content and skill bases.

Achievement standards

A review of the levels of expectation and the language (geographical) employed from Foundation to Year 12 reveals increasing layers of sophistication and degrees of challenge. This would seem entirely appropriate following the same upward trends in the robustness and scope of the content in these courses.

It has been suggested, in the review of content, that greater emphasis should be given to local fieldwork (beginning in the Foundation to Year 3 phase of the course). For me, this expectation should be made clear in the achievement standards throughout the course. Indeed, I’m not convinced that teachers can effectively address the cross-curriculum priority of ‘sustainability’ unless they are outside the classroom on a reasonably regular basis.

I do express surprise, indeed a little disappointment that students are not expected or encouraged to investigate the political considerations of issues; for example, in Year 7 (and in subsequent years), students are asked to ‘propose action in response to a geographical challenge taking account of environment, economic and social considerations’ (p. 55).

This statement seems at odds with the sentiments expressed under the banner of general capabilities ‘personal and social capability’ (p. 10) e.g. ‘respecting and acknowledging diverse perspectives and opinions’ and urging students to ‘take responsible personal, social and environmental action’. In reality, most of the issues that we explore in geography classrooms are heavily underpinned by political considerations. These should be added to the current standards and be introduced at Year 7 level.

Finally, it is believed that the achievement standards crafted for Years 11-12 (Units 1-4) in both ‘geographical knowledge and understanding’ and ‘geography inquiry and skills’ are accurately reflective of the coursework and well graded in terms of their expectations of students who perform across the continuum from A to E levels.

Methodology

(a) Aboriginal and Torres Strait Islander histories and cultures

It is vitally important that we acknowledge this history and cultural enrichment. However, we also need to ensure that there is sufficient balance in a geography course. Studies of the traditional, nomadic, hunting and gathering lifestyle of our Aborigines needs to be compared with those who practise nomadic herding on savannahs, shifting cultivation in rainforests or subsistence farming in the rice paddies of Asia. Similarly, any socio-economic or demographic investigations of the nation’s population should include the 2 per cent who are Indigenous among broader studies of the myriad of ethnic groups and cultures now existing in Australia.

(b) Asia (NE, SE and South) and Australia

Once again, ‘a high-quality geography education should equip students with knowledge about diverse places, people, resources and natural and human environments: (National Curriculum in England, 2013, p. 1). It shouldn’t be restricted to one continent. The selection of Asia appears, at face value, to have been made on strictly political and economic lines. Studies of Papua New Guinea (PNG) and the Pacific nations are almost excluded (a mention in Year 3, p. 31) and given the sheer numbers of Australians who travel to the Pacific, to Europe and to North America each year, there should be more opportunities in the secondary courses to investigate case studies from these areas as well. Our enduring interest in the geopolitics of Antarctica and the environmental threats to its fragile ecosystems go unnoticed. It remains a question of balance and adopting a more even-handed approach.

(c) Sustainability

It would appear, in the absence of subjects like mathematics, English, languages, music and the arts, computing skills, physical education et al, that geography has been chosen as the chief ‘flag-bearer’ (was trying to avoid the term ‘heavy lifting’) to promote this cross-curriculum priority.

As previously stated, geography is admirably equipped to do so but we must guard against the saturation of our pedagogy with this concept. Sustainability represents just another component of any worthwhile exploration of an issue; for meaningful understanding to occur, students need to fully appreciate the physical/geomorphic processes involved and the human/cultural impacts, both positive and negative, that give them the confidence to make accurate judgments about sustainability.

Flexibility in Classroom Delivery

Years of experience on senior geography assessment moderation panels, interacting with teachers from rural and urban schools, as well as time spent teaching in the classrooms of our feeder primary school (and listening to colleagues who teach there full-time) give me the assurance to state that the core content in this learning area should be accessible in most of these contexts. Just as importantly, the content should be able to be delivered, irrespective of the school's level of engagement with digital technology (although better access would significantly enhance aspects of these courses), with considerable flexibility in terms of pedagogy.

Related Issues

In this section of the report, the evaluation focuses on pedagogical characteristics alone. In my estimation, the Australian Curriculum: Geography needs to place a heavier emphasis on the explicit teaching of thinking skills (creative and critical), especially in the secondary courses. We must develop in our students a 'habit of inquiry' and strive to 'transform education and learning from the focus of quantity to quality'. (Tharman, 2005)

Drawing on my previous experience as Director of Studies for a decade (1998-2007), this transformation will not occur without a suitable framework/model, one which teachers can readily embrace because of its simplicity and ease of execution in classrooms. At Toowoomba Grammar School, the adoption of the 'Thinking Skills Framework' devised by itc publications (www.itcpublications.com.au) was widely accepted by staff because it clearly and explicitly links each of the six levels of thinking (represented in the Bloom's Revised Taxonomy) to verbs, sentence/thought starters and employs a range of specific techniques/tools (e.g. Y chart, cause-effect map, decision-making matrix, Pros Cons Questions, Elimination Draw, Alpha Ladder, Extent Barometer) that can be taught explicitly and achieve immediate results in improving problem-solving and decision-making abilities. Another behavioural framework which successfully supported and complemented the 'Thinking Skills Framework' was Costa's 'Habits of Mind' (Persistence, Strive for Accuracy and Precision, Managing Impulsivity' etc.); once again, strongly recommended for consideration on the same grounds – simplicity and ease of execution.

Earlier in the report, it was also proposed that the Australian Curriculum: Geography document should stress the importance of fieldwork outside the classroom and encourage teachers to participate in a range of activities. If this campaign is to be successful, it is suggested that teachers, especially non-specialists, would benefit from more specific guidance in the basic principles of and suitable lines of geographical inquiry for the conduct of worthwhile fieldwork in both natural (physical) e.g. rivers/catchments, coastlines, forests/parks, volcanic landscapes and human/cultural

spheres e.g. urban areas, shopping centres, master planned communities, factories similar to the prescriptive advice of the content elaborations?

Curriculum documentation/accountability and reporting measures

Few problems are anticipated on both fronts. The reading level chosen for the documentation seems appropriate and the expression of content descriptions, geographical inquiry questions and achievement standards should be sufficiently clear, logical (in terms of sequence), coherent and meaningful for most audiences (students, parents, teachers).

As a result, I have confidence that these documents will provide sound foundations for the development of appropriate accountability and reporting measures and that this should lead to effective engagement with most school communities.

Love of Learning? Joy of discovery? Quest for knowledge and related skills?

To my mind, the best curricula offer sufficient prescription for those who need it (e.g. non-specialists) and ensure that those who don't, have the flexibility to ride their imagination, innovation and energy to its limits. Previous experience, as Director of Studies, in observing younger or older practitioners in classrooms, leads me to the solemn belief that engendering a 'love of learning' in youngsters or fostering 'a joy of discovery' (Costa refers to this elevated state as 'a sense of awe or wonderment') often stems from the teacher who possesses a deeper and comprehensive grasp of subject. In short, one needs to be passionate about geography to find the necessary conceptual understandings to fuel the creativity which can deliver these outcomes.

Associate Professor Tan makes a similar observation in his review of recent changes in geographical education in Singapore where he remarks that:

'Teachers need to have a strong conceptual understanding of the topics to be taught and be able to address the essential questions and an enduring understanding of each teaching unit The status of geography depends very much on the quality of geography teachers in schools' (Tan, 2013, p.63)

In my experience, those teachers with a mastery of content and skills develop the confidence to take risks and be a little more adventurous in their pedagogy. Whether lessons are inside classrooms/labs or outside in a natural or urban/human context, those who know their subject have far greater potential to inspire a 'love of learning' or create a 'sense of awe/wonderment' (especially in the outdoors). If one were to argue that the 'joy of discovery' is routinely occurring through the employment of 'student-centred' pedagogies, I would certainly acknowledge that this is often the case but have also found that the message is more powerful/penetrating when it is complemented by a teacher who truly understands the material and can supplement or indeed enhance this experiential learning with a few geography stories of his/her own. For these reasons, I would strongly encourage those responsible for the design and administration of teacher-training programs in this country to heed the advice of Associate Professor Tan.

As far as the extent to which the new curriculum encourages a 'quest for knowledge and related skills', it would be a more effective catalyst for achieving these ends if it broadened its current scope. As previously stated, the knowledge base needs to include stronger emphases on the physical/geomorphic processes responsible for the formation (through the forces of aggradation and degradation) of landscapes, on the politics (or geopolitics) of issues and by adopting a 'spiralling' approach to the essential Place-Name geography which would complement case studies emanating from various continents during the Years 8-12 phase of the course.

The skills offering could be embellished with a standard framework for the explicit teaching of thinking skills (e.g. the itc 'Thinking Skills Framework', based on Bloom's Revised Taxonomy) and a more fervent campaign to convince teachers to teach these vital critical and creative thinking techniques in a more direct fashion. Such frameworks have an excellent track record of transforming teaching practices in schools if they are carefully implemented.

Finally, it's also a time to raise the profile of fieldwork. While there are many geography teachers who are hamstrung by budgetary constraints, they should nonetheless be encouraged to find reasons to study both physical and human aspects of the subject outdoors. Providing suggested frameworks (relevant questions for geography inquiry) and guidelines for such studies may encourage teachers, especially non-specialists, to take up the challenge. It is, in my view, a recipe to overcome 'nature deficit disorder' and can offer opportunities for students to experience the 'joy of discovery' and an enhanced appreciation of learning.

Conclusion

If, as I suspect, our curriculum designers persist with 'sustainability' as a cross-curriculum priority, then I would suggest that geography is uniquely positioned to fully appreciate the physical (including biophysical) and human interconnections and interrelationships that occur as a result of our management (or mismanagement) of resources and ecosystems. For this reason alone (among so many), I'd recommend that geography become a compulsory component of any Australian Curriculum (Foundation – Year 10).

Bibliography

AUSTRALIA/ENGLAND CURRICULA

ACARA, The Australian Curriculum Version 6.0, 21 Jan. 2014

(www.australiancurriculum.edu.au/copyright)

NATIONAL CURRICULUM OF ENGLAND, Geography Programmes of Study, Key Stages 1, 2, 3; Sept. 2013

(www.gov.uk/government/publications/national-curriculum-in-england-geography-programmes-of-study)

SINGAPORE CURRICULUM

www.moe.gov.sg/education/syllabuses/humanities (secondary)

www.moe.gov.sg/education/primary/curriculum

Tan, G. (Assoc.Prof.) Changing Perspectives of Geographical Education in Singapore: Staying Responsive and Relevant, Journal of Geog. Research No. 59, Nov. 2013)

Tharman, S. Achieving Quality: Bottom Up Initiative, Top Down Support (2005)

(www.moe.gov.sg/media/speeches/2005)

THINKING SKILLS

Costa, A. and Kallick, B. Habits of Mind: A Developmental Series, 2000.

(www.artcostacentre.com/html/habits.htm)

www.itcpublications.com.au

10. The Arts (Foundation to Year 10) – Dr John Vallance

Executive Summary

As currently constituted, the Australian Curriculum: The Arts documents are too long, diffuse and tendentious to be comprehensible to students or to parents who want to know what their children are learning. As for the teachers themselves, the language in which the curriculum is expressed belongs firmly to a particular tradition of educational discourse which encourages a belief that technical skill and knowledge are not necessary conditions for being effective in the classroom. Good teachers know that children beyond a certain age simply hate being told what to think, especially when they are being asked to assent to what they well know to be opinions and attitudes. Too much of this material seeks simply to pass on opinions and attitudes without grounding them firmly in knowledge and practice. Given current concern about the quality of teachers and the quality of students entering the teaching profession, the idea that a curriculum like this one could be used by weak classroom practitioners is an extremely worrying one for us as a nation.

The Australian Curriculum: The Arts is rather like a track laying vehicle steered by its own tracks. Even where it claims to chart voyages into creative, unknown territory, it insists that it knows exactly where students need to end up – demonstrating ‘general capabilities’, ‘achievement standards’, awareness of the value of other cultures and the need to live sustainably on our planet – without conveying any sense that the real joy of learning comes from mastering difficult material, and finding ways of building and improving upon it.

Some will inevitably argue that this is a reactionary view which takes little notice of developments in educational thinking over the past fifty years. Certainly it is the case that students and teachers at undergraduate and postgraduate level have come – quite reasonably - to question traditional conceptions of quality, beauty and art. The point here, though, is a more simple one. It should be accepted – indeed encouraged – that pupils will react against what they are taught. This is how society progresses. But for this to be possible, pupils must be taught something meaningful in the first place, even if it is only for them to react against. These curriculum documents appear to have been drafted by experts in ‘education’ rather than by experienced leaders in the disciplines involved. The result is a series of vague, discursive and rambling texts, in which the need to find uniform and consistent terminology is privileged over the specific and distinctive requirements of each discipline.

What I have seen of the Australian Curriculum suggests that it is characterised in general by a tendency towards the elimination of rigour. There is a lot of talk about aspiration, education for innovation, creativity and thinking. Pupils encouraged to have aspirations without the hard educational means to realise them, will fail.

What I have seen of the Australian Curriculum suggests that it is characterised in general by a tendency towards the elimination of rigour. There is a lot of talk about aspiration, education for innovation, creativity and thinking. Pupils encouraged to have aspirations without the means to realise them, will fail.

My recommendation would be that Media Arts, Dance and Drama be subsumed into other parts of the curriculum. The remaining courses should be shortened into concise, yet flexible programs of study along the lines of the English models which are clearly the result of careful work by area experts. At the same time, investment should be made – as I believe the Commonwealth Government is already considering – in music and arts programs aimed at providing high quality mentoring and training for teachers across the country. If the cross-curriculum priorities are to survive this review, they must be more carefully integrated into the whole, and serious efforts must be made to ensure that they do not result in the banalisation of some of the world's great cultures – Indigenous, Eastern and Western.

Review

*'The Australian Curriculum sets consistent high standards for what all young Australians should learn as they progress through schooling.'*¹

The author has been asked to review an Australian Curriculum document dated 18th February 2014, covering the Learning Areas of 'The Arts' – Dance, Drama, Media Arts, Music and Visual Arts. This Review is part of a wider attempt to test the validity of the claim made above by the Australian Curriculum, Assessment and Reporting Authority (ACARA) around the development of the Australian Curriculum; the Arts. At the time of writing, the current status of the curriculum in the Arts, as noted on the ACARA website, is 'pending; not yet available for implementation'.²

The Arts curriculum document submitted for review is 143 pages in length and begins with a general defence of the importance of the arts in Australian schools. There follows a summary of how the individual subjects contribute to the overall learning area in question, some methodological and taxonomical observations which underpin the subsequent material's organisation, and a list of basic definitions. The curriculum document is intended to be read in conjunction with an extended paper General capabilities in the Australian Curriculum which sets out the ultimate purpose of the National Curriculum in a broader social and political context. Three general priority areas which are to be woven organically into the whole curriculum are also outlined here– Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia, and sustainability.

As per the scoping brief, particular attention has been given to the following general questions:

- 1) Does the Australian Curriculum in the area of The Arts represent what Australian students should be taught in schools?
- 2) How does the intended Australian Curriculum in each subject area compare with that of high performing countries and those facing similar challenges?
- 3) Does the Australian Curriculum in this Area reflect what evidence-based research suggests is a sound, rigorous and balanced curriculum?

As per the Terms of Reference, the key criteria for appraisal of the curriculum content, knowledge, and skills are:

¹ ACARA website www.acara.edu.au

² http://www.acara.edu.au/curriculum_1/learning_areas/arts.html

- robustness – interpreted as including a foundation in aims values and principles, academic rigour and relevance
- balance – interpreted as comprehensive inclusion of key core and basic concepts facts and themes without bias as to selectiveness of content and emphasis, and
- scope for choice and flexibility in delivery.

Finally, an assessment is also sought on the strength of the proposed curriculum in comparison to the curriculum in other parts of the world. After discussion, it has been agreed that England and South Korea would be useful points of comparison in this regard.

Section One: Preliminary, General and Specific Observations

Preliminary Observations

All school-age children in Australia should have the opportunity to encounter the arts in some meaningful way. This important point is well-made in the following extract from Rationale section in the Australian Curriculum: The Arts document:

‘...all young Australians are entitled to engage fully in all the major art forms and to be given a balanced and substantial foundation in the special knowledge and skills base of each.’³

In fact one could go further: a serious, skill-focussed, open-ended and non-patronising curriculum in the arts is an essential part of any good primary and secondary school’s teaching program. If we need to have a national curriculum at all, then the core curriculum must include the arts - music and the visual arts in particular.

This has long been accepted around the world in all kinds of jurisdictions. Music in particular has been associated with the most successful school programs, contributing effectively to learning in areas well beyond its own. Many school music courses originating in individual countries have become international in their influence because of this – think of the Orff Schulwerk, the Kodály method, Hindemith’s music programs in Turkey, Suzuki and more recently the spectacular success emanating from Venezuela of El Sistema – the *Fundación del Estado para el Sistema Nacional de las Orquestas Juveniles e Infantiles de Venezuela*, for many years known simply as ‘Social Action for Music’. *El Sistema*, with its focus on teaching young people first of all how to sing and read music, then to play musical instruments, is widely followed in the United States, to great success and acclaim. It has now reached Australia.⁴

The arts are an indispensable part of a child’s education for many reasons. First, they build social confidence and self-respect. They provide the equipment for the lifelong enjoyment and exploration of different forms of human communication. For some the arts will open routes to satisfying and socially useful employment. Even at the level of national security and social cohesion, it has been well demonstrated that a broad grounding in the arts is an effective prophylactic against some forms of anti-social political extremism. Societies which support the education of young people in the arts

³ The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, page 12

⁴ <http://sistemaaustralia.com.au/about.html>

provide their citizens with gifts and pleasures that can never be taken away from them. They leave other parts of the curriculum which demand more solitary forms of work, and I have noticed over the course of my own career that young people who have received training in the creative arts alongside other, more academic parts of their education, take a broader and more generous view of their obligations as citizens than their peers with a more narrowly focused education.

In short, the arts lie at the heart of any healthy society. It follows that they must be an organic and consistent part of any school curriculum. I am not convinced that these points are made forcefully enough in the documents under review.

Everything in this report is predicated on an insistence that the creative arts must have a clearly defined (and compulsory) place in a national curriculum.

General observations

- i) The curriculum document under review begins with a general analysis of ‘Rationales’ and ‘Aims’.

According to these statements, the Arts aim to develop students’:

- creativity, critical thinking, aesthetic knowledge and understanding about arts practices through making and responding to artworks with increasing self-confidence
- knowledge and skills to communicate ideas
- use of innovative arts practices with available and emerging technologies, to express and represent ideas, while displaying empathy for multiple viewpoints
- understanding of Australia’s histories and traditions through the Arts, engaging with the artworks and practices, both traditional and contemporary, of Aboriginal and Torres Strait Islander Peoples
- understanding of local, regional and global cultures, and their Arts histories and traditions, through engaging with the worlds of artists, artworks, audiences and arts professions⁵.

More specific aims are listed for each subject area. There follows a short summary of what each course involves⁶:

- In Dance, students use the body to communicate and express meaning through purposeful movement. Dance practice integrates choreography, performance and appreciation of and responses to dance and dance making.
- In Drama, students explore and depict real and fictional worlds through use of body language, gesture and space to make meaning as performers and audience. They create, rehearse, perform and respond to drama.

⁵ Australian Curriculum, The Arts p. 5

⁶ Australian Curriculum, The Arts p. 6

- In Media Arts, students use communications technologies to creatively explore, make and interpret stories about people, ideas and the world around them. They engage their senses, imagination and intellect through media artworks that respond to diverse cultural, social and organisational influences on communications practices today.
- In Music, students listen to, compose and perform music from a diverse range of styles, traditions and contexts. They create, shape and share sounds in time and space and critically analyse music. Music practice is aurally based and focuses on acquiring and using knowledge, understanding and skills about music and musicians.
- In Visual Arts, students experience and explore the concepts of artists, artworks, world and audience. Students learn in, through and about visual arts practices, including the fields of art, craft and design. Students develop practical skills and critical thinking which informs their work as artists and audience.

This seems unexceptionable if a bit colourless. A consequent structural distinction between ‘making’ and ‘responding’, between productive and receptive, analytical and creative skills is similarly reasonable at first sight, though it is not without its problems. As the elaboration of the curriculum moves further into taxonomical detail – dividing materials and questions in ‘viewpoints’, ‘questions’, ‘bands’, ‘content descriptions’, ‘content elaborations’ and ‘achievement standards’ it becomes increasingly vague, unbalanced and unfocused. Documents like this tend to be prisoners of the standardised language used for their communication. Form – dictated by a methodological assumption that all the curriculums should be described in similar standardising, formal language - starts very quickly to dominate content, with inconsistent results.

There is no clear and unambiguous indication in the curriculum of the amount of regular class time it is envisaged being spent teaching the component parts of the Arts curriculum. This makes them still harder to judge in an overall sense.

The relative importance in the context of all Australian schools of each of these component subjects in the Arts Curriculum is highly debatable. The demands of formal standardisation, however, require that they be presented in terms wholly consistent with one another. The fact that Media Arts has been allowed into the curriculum in the first place means that it is described in the same kind of terms as music and the visual arts and this leads to immediate awkwardness. Media Arts, arguably, does not require a separate curriculum at all; the content set out in the Media Arts curriculum could readily be covered in other places – in Visual Arts, English, history, Music and so on. (This is the view taken in several other jurisdictions, including England and South Korea which are examined in this report.) Dance and drama, though obviously important, should not arguably have a claim on formal time in a core curriculum either. Surely they are better pursued as co-curricula activities, especially in the early years of school.

The reactive introduction of new subjects in response to pressure from lobby groups, or advocates of the social and commercial value of new technologies causes a great deal of difficulty in schools, especially the less well-resourced schools, and can have the effect paradoxically of depriving

teachers of the opportunity to prioritise potentially innovative aspects of what they teach in the context of their own and their pupils' capacities and interests.⁷ The types of skills covered in Media Arts could usefully be made into cross-curriculum priorities, part of the furniture of every course.

Second, a rather crude bilateral taxonomy divides the Arts curriculums into areas of 'making' and 'responding'. One can either be a producer or a member of an audience. (Although an artist, says the curriculum, is also his or her own audience.) Is there any room to be a student? At many points – especially in subjects like music and drama – this distinction is more a hindrance than a help. It encourages an empty sense of confidence which can be very alienating to the pupils who actually have to do the work and find it challenging. 'Making' throughout is privileged over 'learning how to make', and there is inadequate space in the curriculum for reading, listening and reflecting. What is more – and this is especially notable in the music and visual arts courses – there is an assumption that intuitive forms of expression are enough on their own, without an additional need for disciplined training in the content-founded skills required for effective communication.

The third main instance where standardised language and ideas do violence to the material is in the case of the so-called 'cross-curriculum priorities'. At an early stage it was agreed that '...the Australian Curriculum must be both relevant to the lives of students and address the contemporary issues they face.' With these considerations ... in mind, the curriculum gives special attention to these three priorities:⁸

- Aboriginal and Torres Strait Islander histories and culture
- Asia and Australia's engagement with Asia
- Sustainability.

The three cross-curriculum priorities of Aboriginal and Torres Strait Islander culture, engagement with Asia, and sustainability, have on the whole been clumsily integrated with the curriculums under review here. Without any serious attempt to establish the practical relevance of these priorities to the specific learning areas, all the curriculums under review seem lopsided and unbalanced. By privileging, say, indigenous or Asian contributions to musical art over others, especially those related to the Western cultures of the majority of Australian students, the curriculum runs the serious risk of placing pupils at a great and isolating disadvantage, cutting them off from some of the most long-lived and highly valued human achievements in the arts.

At the same time, the integration of indigenous and 'Asian' material also risks limiting and patronising Australian children's encounters with the amazing richness and variety of complex cultures, both indigenous and Asian. The general and constantly repeated talk of 'Asia' for example – which strictly covers the world from East of the Nile to Japan - calls to mind the very worst of the traditional Western reductionist prejudices. In the very act of seeking to open Australian children's minds to the cultures of our closest neighbours, the authors of the curriculum do these cultures a

⁷ The case of technology is an especially significant one in this context, and it is rarely examined critically. The history of technology in education is a history of finding very costly improved means to unimproved ends.

⁸ ACARA, *The Australian Curriculum: The Arts*, Version 7.1 dated Monday, 25 August 2014, p. 285

great disservice by homogenising them, rendering them inaccessible in the process. One possible way of clarifying the situation might be to link the Government's priority Asian languages to the curriculums in some way, thereby giving some indication to schools and teachers of which Asian cultures might best be privileged.

The case with Aboriginal and Torres Strait Islander Art is slightly different, though no less worrying. The way in which indigenous art is integrated in the Visual Arts curriculum with other traditions of visual expression suggests a disturbing ignorance of the status and spiritual importance of visual and aural expression in indigenous cultures. I find it hard to believe that indigenous artists will wish to have their mysteries, traditions and religious secrets bowdlerised in Australian classrooms by teachers without special training. The idea that modern Western secular art and Aboriginal art are somehow analogous is extraordinarily simplistic.

In short, methodological and well-intentioned socio-political motivations trump content at nearly every point. In fact the absence of serious content in these courses is particularly striking when we come to compare them against international analogues. I will return to this matter later.

There is, of course, a long-standing tension in pedagogical circles between what one might call a content-driven, classical approach where the teaching of subject matter comes first, and an opposing view that students should be permitted to learn what they think they want and need to learn at points in their development when they deem it relevant. An ideal position may stand somewhere between these two extremes. In the case of all the arts, I would insist that school courses should provide a solid and carefully sequenced foundation in the practical and intellectual skills needed for effective artistic expression. I am not convinced that this curriculum achieves that aim.

Specific observations

Dance Curriculum

Quite apart from the benefits which accrue from studying dance in its own right, as an activity in primary schools it is useful in giving all children, and especially boys, physical and ultimately social confidence. It is pleasing to see a reminder of the importance of dance, although I am not convinced that it is a necessary part of the national curriculum at high school. There is certainly a case for it being an elective subject.

Although in general terms overwritten – partly because of the formal requirements of the curriculum's language - I do not have any specific criticisms of the dance curriculum. Its importance is not central, and it may well be that dance is better pursued in an extra-curricular context even at primary level.

Drama Curriculum

The curriculum here is flexible enough to permit the study of drama through history and across cultures. There is a strong emphasis overall on performance – good in a primary context in particular - and not much about the study of dramatic texts, presumably on the assumption that this is done in English. The assumption may not be a good one – it is hard to conceive of pupils developing their

knowledge and skill in this area at high school without the study of texts, much as music students need to study scores.

The curriculum in the Foundation years is unexceptionable, although much will depend on the experience of the teacher. In Years 4 and 6 the curriculum becomes a little vague, with worthy references to pupil's 'community' without much exploration of their pedagogical relevance. A tension between meaningful content and tokenistic gestures becomes apparent at this level, and persists through the rest of the curriculum. In Years 5 and 6, heavy-handed iterations of the cross-curriculum priorities are wearisome; children are likely to start seeing through this contrived regime even at this point.

At the secondary level, the emphasis on performance persists, but the importance of critical evaluation of quality does start to show through. There is a pleasing inclusion of content relating to the roles of director and company in the later years.

That said, and important though it is as a part of any good school education, I am not convinced that drama should have an independent place in the core national curriculum.

Media Arts Curriculum

I do not accept the need for a separate curriculum in Media Arts. Certainly it does not stand well as a separate subject alongside music and visual arts. The various skills and ideas involved here are arguably more sensibly integrated into other curriculums in English, visual arts, music – indeed in many of the subjects taught at school. Media Arts does not form a separate part of the national curriculum in either England or South Korea.

Music Curriculum

Music is a subject of fundamental importance in any good school. I cannot stress too strongly the benefits of giving all children the chance to learn about music - what it is, how it is played and enjoyed, how others before us have expressed themselves through this universal form which seems mysteriously to come before verbal language. Most of all, of course, children must be taught how to read, appreciate, play and enjoy it themselves.

ACARA's Consultation Report into the Music Curriculum, published in November 2012, makes it very clear that the Australian music community was, on balance, unhappy with the draft curriculum.⁹ This final version does not in my view take sufficient notice of the criticisms made in that document. Amongst those criticisms made at the time of the Consultation Report, one might repeat the following excerpts from that Report:

'This is a curriculum that seems intended to support both the classroom teacher without music education and the specialist teacher with a lifetime of music making experience and teaching experience. But is this possible?'

'[There is a] distinct lack of quantifiable music skills, notation and appropriate terminology throughout.'

⁹ Draft Australian Curriculum: The Arts, Foundation to Year 10, Consultation Report, November 2012, pp 63-67

‘The content descriptions and elaborations must be more specific about the necessary skills and knowledge required. Children need to be secure with the skills and language of music before they can confidently creatively apply and interpret them.’¹⁰

These criticisms are well made. Descriptions of content – i.e. what, exactly needs to be taught, at the level of detail - and their elaborations in the music curriculum are on the whole vague. On one analysis, this is not necessarily a bad thing; vagueness does allow individual schools and teachers an opportunity to focus on particular parts of the curriculum as permitted by the resources available. But the differentiation and specification in the level of content at various age points is very poor and the curriculum provides a weak level of guidance for those teachers and schools most in need of it.

Content descriptions notably lack any meaningful focus on the teaching of Western music notation – a foundational tool for anyone planning to pursue an interest in practical music whatever its origin – and there is no meaningful reference to the teaching of music theory, harmony or counterpoint. By the time a pupil completes Year 10, a music course should certainly, at the very least, have covered basic technical matters such as notation, scales, tuning systems and the elements of harmony. To take just one example out of many possible, anything more than the most cursory engagement with the music of Asian countries is impossible without some technical experience of Western and non-Western tuning and scaling systems.

In other countries, school music programs place varying emphases on practical as against theoretical challenges. It is clear that a balance must be struck, and in mandatory general courses the emphasis should probably be practical, on music-making. But this could certainly and usefully be made more explicit in the curriculum.

Throughout, the encouragement of expression through intuition is placed before learning – sleepwalking into music, one might say.

I discussed this curriculum with a well-known and highly respected figure in Australia’s musical life. We both agreed that good music teachers would take little notice of it, and poor ones would lose themselves in a bureaucratic miasma of para-musical, or even un-musical banality.

There is a practical alternative. Far more useful than a confused and vaguely prescriptive curriculum like this, in my view, would be a national network of specialist music teachers, mentored in the classroom if necessary by other musicians teaching elementary music skills to children in a carefully sequenced manner. I am told that the Australian Government is currently considering just such a scheme. If a curriculum really is required, a short document along the lines of the English one, with accompanying programs of study, would suffice.

Visual Arts Curriculum

Content descriptions at all levels tend to be very general, and there is little useful sense of sequencing the ascending levels of difficulty in taught skills.

¹⁰ Consultation Report (2012) p. 68

Take for example this statement from the Foundation to Year 2 achievement standard, for children aged from five to seven years old -¹¹

‘Students make artworks in different forms to express their ideas, observations and imagination, using different techniques and processes.’

- against this vague formulation, from the Years 9 and 10 achievement standard, for children aged fifteen and sixteen¹²:

‘Students manipulate materials, techniques and processes to develop and refine techniques and processes to represent ideas and subject matter in their art works.’

It is not at all clear from what comes between Year 2 and Year 10 just what is supposed to have happened, for ‘making’ to become ‘manipulation’.

Once again, as was the case with music, this has a positive side to it; the curriculum is sufficiently vague to allow individual schools and teachers with the capacity to do so, to adjust their work to their particular circumstances. On the negative side, it means that the curriculum gives very little specific and detailed guidance. Less well-resourced schools will be the first to suffer.

Section Two: Comparison with Foreign Curriculums

Even at the most general level, the Australian Curriculum stands apart in terms of its vague worthiness. Take, for instance, the following three passages. The first comes from the opening of the English national curriculum framework document. The second from its equivalent in Korean Curriculum, and the third from our Australian context.

English Curriculum

‘The national curriculum provides pupils with an introduction to the essential knowledge that they need to be educated citizens. It introduces pupils to the best that has been thought and said; and helps engender an appreciation of human creativity and achievement.’¹³

South Korean Curriculum

The ‘Vision for the Educated Person’ at the heart of the South Korean Curriculum and presents a distinctive blend of traditional Korean values coloured by centuries of Western influence¹⁴:

Education in Korea aims to assist every citizen in building up one’s character based on humanitarianism, to manage a humane life by developing autonomous life skills and the qualifications needed as a democratic citizen, and to contribute to the development of a democratic country and realise the public idealism of humankind.

¹¹ ACARA, The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, p. 135

¹² ACARA, The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, p. 152

¹³ The national curriculum in England: Framework document: for teaching 1 September 2014 to 31 August 2015, September 2013, page 6. Can be accessed at: <https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4>.

¹⁴ <http://ncic.kice.re.kr/english.kri.org.inventoryList.do#>

Based on this purpose on education, this curriculum pursues the vision for the educated to be as the following:

- a. One who pioneers the development of individuality and career on top of a holistic development
- b. One who shows creativity with new thinking and challenges based on basic capabilities
- c. One who leads a dignified life based on understanding cultural knowledge and pluralistic values
- d. One who participates in community development possessing the spirit of consideration and sharing, as a citizen communicating with the world.

The Australian Curriculum:

'The Australian Curriculum is designed to meet the needs of students by delivering a relevant, contemporary and engaging curriculum that builds on the educational goals of the Melbourne Declaration. The Melbourne Declaration identified three key areas that need to be addressed for the benefit of both individuals and Australia as a whole. In the Australian Curriculum these have become priorities that provide students with the tools and language to engage with and better understand their world at a range of levels. The priorities provide dimensions which will enrich the curriculum through development of considered and focused content that fits naturally within learning areas. They enable the delivery of learning area content at the same time as developing knowledge, understanding and skills relating to Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia or sustainability. Incorporation of the priorities will encourage conversations between learning areas and between students, teachers and the wider community.'

Cross-curriculum priorities are addressed through learning areas and are identified wherever they are developed or applied in content descriptions. They are also identified where they offer opportunities to add depth and richness to student learning in content elaborations. They will have a strong but varying presence depending on their relevance to the learning area.'

Compared to the other two examples, our curriculum appears organised around a series of unfocused, apparently unexamined assumptions which have their origins far outside the classroom.

In some form or other, the Arts figure in all the national curriculums of which I am aware. Focus here is on the visual arts curriculum in England for Key Stages 1 to 3 (covering ages 5 to 15), and a similar curriculum in South Korea covering pupils of broadly similar ages. The relevant documents here were provided by the Secretariat, Review of the Australian Curriculum based in the Australian Government Department of Education in Canberra. Comparisons with foreign courses in dance, drama and media arts are more difficult because of the lack of strictly analogous elements in the national curriculums of other countries¹⁵. The question how far Australia should allow the number of subject areas in the curriculum to expand is a good one, but it cannot be answered here. Similarly, the lack of meaningful assessment benchmarks means that cross-country comparisons at the level of achievement standards are not possible in the way that arguably they are with other subjects.

¹⁵ The National Curriculum status of drama in particular has attracted some criticism in the English press. See for instance <http://www.theguardian.com/teacher-network/teacher-blog/2012/oct/30/defence-school-drama-arts-curriculum-ebacc>

The England National Curriculum in 'Art and Design' for the first two years of primary school sets out its purpose and aims succinctly, and in general terms. The importance of an understanding of traditional art practices and the work of English artists is made clear without this necessarily forming a restriction on further exploration. Second, there is a clear emphasis even at the earliest stages on the development of technical skill, and in particular technical skill in drawing. It is widely accepted throughout the world that drawing lies at the heart of serious education in the visual arts. Yet this central aspect of art education – widely available to pupils at relatively low cost, does not have a privileged status in the Australian Curriculum. This should be a matter of great concern.

In South Korea, where schooling is divided broadly into six years of primary, three years of junior high and three years of senior high, a national curriculum is provided by the Ministry of Education and Human Resources Development. Fine Arts (what we call Visual Arts) and music are separate subjects in the curriculum. Drama, dance and media arts are not given subject headings of their own.

The English National Curriculum distils the point and the programming of its Art courses into the following summary. Because it is a model of its kind, it is reproduced here in full¹⁶:

Purpose of study

Art, craft and design embody some of the highest forms of human creativity. A high quality art and design education should engage, inspire and challenge pupils, equipping them with the knowledge and skills to experiment, invent and create their own works of art, craft and design. As pupils progress, they should be able to think critically and develop a more rigorous understanding of art and design. They should also know how art and design both reflect and shape our history, and contribute to the culture, creativity and wealth of our nation.

Aims

The national curriculum for art and design aims to ensure that all pupils: produce creative work, exploring their ideas and recording their experiences become proficient in drawing, painting, sculpture and other art, craft and design techniques evaluate and analyse creative works using the language of art, craft and design know about great artists, craft makers and designers, and understand the historical and cultural development of their art forms.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant Programme of study

Subject content

Key Stage 1 (ages 5 – 7)

Pupils should be taught:

¹⁶ UK Department for Education (2013), Statutory Guidance: National curriculum in England: art and design programmes of study, published 11 September 2013, can be accessed at: <https://www.gov.uk/government/publications/national-curriculum-in-england-art-and-design-programmes-of-study>

- *to use a range of materials creatively to design and make products*
- *to use drawing, painting and sculpture to develop and share their ideas, experiences and imagination*
- *to develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form and space*
- *about the work of a range of artists, craft makers and designers, describing the differences and similarities between different practices and disciplines, and making links to their own work.*

Key Stage 2 (ages 7-11)

Pupils should be taught to develop their techniques, including their control and their use of materials, with creativity, experimentation and an increasing awareness of different kinds of art, craft and design.

Pupils should be taught:

- *to create sketch books to record their observations and use them to review and revisit ideas*
- *to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials (e.g. pencil, charcoal, paint, clay)*
- *about great artists, architects and designers in history.*

Key Stage 3 (ages 11-15)

Pupils should be taught to develop their creativity and ideas, and increase proficiency in their execution. They should develop a critical understanding of artists, architects and designers, expressing reasoned judgements that can inform their own work.

Pupils should be taught:

- *to use a range of techniques to record their observations in sketchbooks, journals and other media as a basis for exploring their ideas*
- *to use a range of techniques and media, including painting*
- *to increase their proficiency in the handling of different materials*
- *to analyse and evaluate their own work, and that of others, in order to strengthen the visual impact or applications of their work*
- *about the history of art, craft, design and architecture, including periods, styles and major movements from ancient times up to the present day.*

This concise outline provides a useful guide to what is expected, without clipping the wings of teachers unnecessarily.

In the case of music, the English curriculum is similarly successful. Here is the corresponding programme of study for music¹⁷:

Subject content [Music]

Key Stage 1 (ages 5-7)

Pupils should be taught to:

- *use their voices expressively and creatively by singing songs and speaking chants and rhymes*
- *play tuned and untuned instruments musically*
- *listen with concentration and understanding to a range of high-quality live and recorded music*
- *experiment with, create, select and combine sounds using the inter-related dimensions of music.*

Key Stage 2 (ages 7-11)

Pupils should be taught to sing and play musically with increasing confidence and control. They should develop an understanding of musical composition, organising and manipulating ideas within musical structures and reproducing sounds from aural memory.

Pupils should be taught to:

- *play and perform in solo and ensemble contexts, using their voices and playing musical instruments with increasing accuracy, fluency, control and expression*
- *improvise and compose music for a range of purposes using the inter-related dimensions of music*
- *listen with attention to detail and recall sounds with increasing aural memory*
- *use and understand staff and other musical notations*
- *appreciate and understand a wide range of high-quality live and recorded music drawn from different traditions and from great composers and musicians*
- *develop an understanding of the history of music.*

Key Stage 3 (ages 11-15)

Pupils should build on their previous knowledge and skills through performing, composing and listening. They should develop their vocal and/or instrumental fluency, accuracy and expressiveness; and understand musical structures, styles, genres and traditions, identifying the expressive use of musical dimensions. They should listen with increasing discrimination and awareness to inform their practice as musicians. They should use technologies appropriately and appreciate and understand a wide range of musical contexts and styles.

¹⁷ UK Department of Education (2013). Statutory guidance: National curriculum in England: music programmes of study, published 11 September 2013, can be accessed at: <https://www.gov.uk/government/publications/national-curriculum-in-england-music-programmes-of-study>

Pupils should be taught to:

- *play and perform confidently in a range of solo and ensemble contexts using their voice, playing instruments musically, fluently and with accuracy and expression*
- *improvise and compose; and extend and develop musical ideas by drawing on a range of musical structures, styles, genres and traditions*
- *use staff and other relevant notations appropriately and accurately in a range of musical styles, genres and traditions*
- *identify and use the inter-related dimensions of music expressively and with increasing sophistication, including use of tonalities, different types of scales and other musical devices*
- *listen with increasing discrimination to a wide range of music from great composers and musicians*
- *develop a deepening understanding of the music that they perform and to which they listen, and its history.*

The South Korean curriculum documents are extensive and reasonably detailed. The extent and detail are taken up with reasonably explicit indications about content¹⁸:

At the third and fourth grade level in primary school, content in Visual Arts is divided into the categories of 'Aesthetic experience', 'Art production', and 'Art appreciation' – a tripartite division which continues through the curriculum. There is a sense here of the importance of sequencing, building of previous knowledge as skills and sensibilities develop. In my view, the Korean documents are not as strong in this area as their English equivalents, but are less parochial than their Australian counterparts.

Third and Fourth grades

A. Aesthetic experience

(a) Natural environments

Students perceive the beauty of natural environments through various explorations and activities. ① Searching line, shape, color, texture, value, movement and so on in natural objects and phenomena. ② Using the senses and functions of the body and exploring them in different ways.

(b) Visual cultural environments

Students perceive the beauty of visual cultural environments through various explorations.

① Searching line, shape, color, texture, value, movement and so on in living things, living spaces, visual imageries, and so on. ② Using the senses and functions of the body and exploring them in different ways.

¹⁸ Korean Ministry of Education and Human Resources (2009). Fine Arts Curriculum, page 10, accessed at: <http://www.ncic.go.kr/english.kri.org.inventoryList.do#>.

B. Art production

(a) Thematic expression

Students are able to represent a theme using creative ideas. ① Expressing different objects based on observation. ② Expressing feelings and thoughts with creative ideas. ③ Expressing sounds, movements, stories and so on in association with other subjects.

(b) Techniques

Students are able to express as they experiment with basic materials, tools, and techniques. ① Understanding how to use art materials and tools to make art. ② Experimenting and demonstrating different techniques of using art materials and tools.

(c) Art elements and principles

Students are able to express themselves as they experiment with art elements and principles. ① Expressing art elements and principles discovered in nature and visual cultural environments. ② Employing art elements and principles and expressing them freely.

(d) Processes

Students are able to develop an interest in the process of art making. ① Making art based on a plan of expression. ② Making art with consideration of the matters to be attended to in expression.

C. Art appreciation

(a) Artworks

Students are able to develop an interest in understanding and appreciating artwork. ① Searching for artwork and art terms. ② Discussing feelings and thoughts about artwork with each other.

(b) Art culture

Students are able to develop an interest in art culture. ① Experiencing traditional art nearby. ② Appreciating different artwork in living spaces or exhibitions.

By the beginning of High School, there is a clear expectation that both critical and technical sophistication is developing.

First grade, High school

A. Aesthetic experience

(a) Natural environments

Students understand the relationship between natural environments and plastic awareness. ① Investigating the changes in plastic awareness according to natural environments. ② Discussing ways to construct ecological environments.

(b) Visual cultural environments

Students judge the social and cultural values of visual cultural environments. ① Investigating the influence of visual cultural environments on ways of living and thinking. ② Discussing about changes in visual cultural environments and various careers in art.

B. Art production

(a) Thematic expression

Students express using new themes, techniques, and mediums. ① Expressing personal, social, and cultural meanings in a theme. ② Considering different purposes, conditions, and effects of art making. ③ Making art in different techniques and different medium as they expand the use of art materials and tools. ④ Expressing a theme in association with other disciplines and school events.

(b) Processes

Students examine the process of making art and use the process for future creations. ① Producing a portfolio. ② Reflecting the assessment of process for planning future creations.

C. Art appreciation

(a) Artworks

Students judge and appreciate different values of artworks. ① Understanding different styles and aesthetic values according to time and place. ② Discussing about different values of artworks. ③ Knowing the form of criticism and writing a critique.

(b) Art culture

Students understand the value of art culture and seek ways of improving it. ① Searching for the means to inherit and improve traditional art. ② Searching for ways to improve local culture as the center of exhibitions.

The South Korean curriculum is not nearly as concise or clear as the English equivalent. Yet even here there is more focus than at the Year 10 level in the Australian Curriculum which sets out what needs to be done at the end of the Visual Arts curriculum in the following terms:¹⁹

- *Conceptualise and develop representations of themes, concepts or subject matter to experiment with their developing personal style reflecting on the styles of artists, including Aboriginal and Torres Strait Islander artists*
- *Manipulate materials techniques, technologies and processes to develop and represent their own artistic intentions*
- *Develop and refine techniques and processes to represent ideas and subject matter*

¹⁹ ACARA, The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, p. 148-151, can be accessed at: <http://www.australiancurriculum.edu.au/Download/F10>

- *Plan and design artworks that represent artistic intention*
- *Present ideas for displaying artworks and evaluate displays of artworks*
- *Evaluate how representations communicate artistic intentions in artworks they make and view to inform their future art making*
- *Analyse a range of visual artworks from contemporary and past times to explore differing viewpoints and enrich their visual art-making, starting with Australian artworks, including those of Aboriginal and Torres Strait Islander Peoples, and consider international artworks*

Section Three: Analysis and Conclusions

Debates about what should be taught in schools and how it should be taught have polarised teachers and teaching authorities for centuries. The violence of the disagreements in the current areas under discussion – which can readily be tracked by looking through the records of the ACARA consultation processes - underline the reality that we are not dealing with objective matters here. Educational debates tend to be driven by opinion and fashion. The more tendentious the opinion, the more statistics are produced in compensation. The introduction of quasi-scientific granularity in the form of analysis, benchmarks and reviews cannot cloud the reality that individual communities must ultimately resolve these disputes with the aid of careful judgement. Some brief historical background will help us put the debate over curriculum into the fullest possible perspective.

At one extreme, they centre on paradoxical arguments in favour of the utility of so-called ‘useless subjects’ in the curriculum. Thousands of years ago, Socrates was asking what subjects should be in the curriculum for the guardians of the ideal community. He drew up a list – it included geometry, stereometry (the geometry of solids), astronomy, arithmetic and harmonics.²⁰ Socrates’ companions went through the list, praising the utility of these subjects. Geometry, for instance, is useful because it helps us survey land and resolve disputes. Astronomy is useful because it aids navigators and provides guidance about the seasons to farmers and travellers. And so on. Socrates replied that these subjects are not included in his curriculum because of their practical utility, but because they provide access, through their objective mathematical content, to truth, to facts, to ‘ideas’ which are perfect. This in turn gives a solid foundation for further thought and action about the variety of challenges thrown up by life. If you can access the truth – in this case through mathematics – then you can work on to other things from there.

Although it underwent dozens of major changes, this idea that there is a body of accepted knowledge (‘truth’, on the hardline thesis) which teachers need to hand down to their pupils has been extremely influential ever since. It rapidly came to be acknowledged that truth can change - knowledge of course changes all the time, but on this strict view, pupils are secondary in status to what they are taught. They are judged in terms of their capacity to comprehend this inherited knowledge.

This hardline view of education based ideally in abstract content has never died away, and has been revived in modern times by figures such as E.D. Hirsch, and Allan Bloom to name only two out of

²⁰ Plato, Republic Book VII

many possible. It colours the approach to schooling in countries like France, and – softened slightly – is a feature of education in traditional, academically conservative schools around the world. The modern idea behind this line of argument is that pupils must master the basics in a subject before they can be allowed to progress to the level of critical interaction with its domain. In educational circles today, it tends to be a controversial position.

In the late eighteenth century, a rival thesis came to prominence. It was set against the traditional, classical view of education outlined above, and insisted that children had no need of massive amounts of more or less useless knowledge which would be of no practical relevance in the conduct of their lives. Moreover, states and communities had no need of leaders who were able to contemplate mathematical perfection and draw practical conclusions therefrom. Plato's republic, after all, had been a failed experiment in government which was never even fully adopted anywhere. Subsequent attempts at the organisation of systems of government around philosophical systems had equally failed. What was more important was an approach to education which put the pupil at the centre of the action.

This 'romantic' view of education, associated most directly with Jean-Jacques Rousseau's *Emile* (1762), holds that traditional 'drill and kill' methods of teaching old ideas stifle the creativity of the young. Children should have a say in what they learn, and should be able to determine the contents of their curriculum and the speed at which they progress through it.

In an extreme form, this approach can be seen in a modern context in places like the 'Sudbury Valley' schools in the USA. This extract from the main Sudbury Valley school's website puts its position clearly, through the mouth of a pupil:

I didn't really think about getting an education. I didn't understand the idea of having to artificially 'get' an education. I thought that you lived in the world and you got smarter because every day you were learning. I thought that there was no way to get dumber unless you were erasing stuff out of your brain. It seemed to me that one day you were talking to someone about one subject and another day you were talking to someone about another, and that eventually you would get around to all of them.²¹

The most successful education systems strike a reasonable balance between the two extreme positions. Our Australian school system over the years has been moving further and further towards a Rousseau-like, Sudbury style 'romantic' model. This in turn has led to a strong tendency to privilege matters of pedagogy over content. Members of the Board and senior staff of ACARA, for instance, are mainly experts in teaching methods and assessment rather than specific specialists in any of the major subjects taught in school. For too long, curriculum development in Australia has been left in the hands of educators, rather than subject specialists. The results will be hard to reverse.

An emphasis on pedagogical methods has brought with it serious problems when it comes to finding equitable ways of assessing the achievement of pupils. It is fair to say that the lion's share of resources in Australian over the past twenty years has been spent on studying how children should

²¹ <http://www.sudval.org/>

be taught and assessed, rather than looking in detail at what they need to know if they are to progress, and where we wish them to progress.

This, put briefly, is the situation with the current Arts curriculum. The pendulum has swung decisively away from content towards general rumination about the ideal qualities which should underpin a child's education at school. I am certainly not advocating a return to the other extreme but a more balanced approach.

Armed with this background, we can return to the Arts. It is based, as we agreed at the outset, on the principle that '...all young Australians are entitled to engage fully in all the major art forms and to be given a balanced and substantial foundation in the special knowledge and skills base of each.' A laudable principle which should have strong support.

The curriculums themselves, however, are far from being either balanced or substantial. They appear overlong, overworked and unfocused. They are the obvious product of multiple compromises, deals with interested parties and the red pen of educational bureaucrats. At nearly every point they lack rigour. In turn they are vaguely prescriptive and prescriptively vague. The intellectual world from which they emanate is increasingly out of date. The days that teachers feel they can usefully teach 'skills' and 'capabilities' in the abstract, without demanding knowledge-based content to underpin and give meaning to these skills are rapidly coming to an end in other parts of the world. Scholars and teachers outside Australia are increasingly realising that one cannot criticise, or think about, what one does not know or understand. Australian children are being told that they can run before they can walk; it is a cruel hoax. They cannot.

At the level of its general moralising tone, the curriculum is especially weak. One cannot reflect on the standards or values of a community – local or foreign – without a detailed knowledge of that community. One cannot 'value' a culture without knowing what it is, either at the level of detail, or through carefully chosen case studies. It is meaningless to instruct children to value and respect everyone everywhere on principle just because the educational bureaucracy tells us that we must, rather than understand the ways in which cultures differ. Yet the curriculum instructs us to do just this at one point²² - whilst at the same time telling the same children that they must learn how to think critically.²³

There have been other jurisdictions in which prescriptive, lengthy curriculum documents have been successfully enforced – notably in France and arguably in South Korea. But in France, the traditional national curriculum has been very strictly grounded on the development of classical, positivist knowledge. One striking effect of this has been a powerful reaction against classical positivist models of thought at university level. In fact France, arguably, is an ultimate source of much of the anti-positivist intellectual relativism which informs the Australian curriculum. In France it makes sense, because this is a strong reaction against an existing, already mastered body of knowledge and

²² ACARA, The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, p. 15-20, can be accessed at: <http://www.australiancurriculum.edu.au/Download/F10>

²³ ACARA, The Australian Curriculum: The Arts, Version 7.1 dated Monday, 25 August 2014, p. 15-20, can be accessed at: <http://www.australiancurriculum.edu.au/Download/F10>

experience. In the Australian context there is no such body of knowledge and experience. We have the reaction without the action, and this makes no sense to students.

One of the most striking aspects of teaching is that pupils – not just talented and engaged pupils, but all pupils – tend to react productively and creatively against what they are taught. Any good curriculum must allow for this. Sometimes reaction from pupils is taken as evidence that they are being taught the wrong thing. Far from it; effective influence has often taken this form throughout history. Aristotle reacted against Plato, Alexander the Great against Aristotle, and so on through the ages. Germaine Greer reacted against her schooling, but arguably would not have done what she did without something strong to kick against. The Australian Curriculum seems to encourage, under the guise of stimulating creativity and innovation, a particularly enervating form of dead-end compliance and docility.

Attempts at the large scale direction of what happens in the classroom have nearly always drowned in bureaucracy and futility when they are trying to do social good. Such attempts work better when they make explicit and clear demands on pupils and teachers. There is an old saying: ‘mass education is bad for the same reason that cooking in large kitchens is bad’.

Does the Australian Curriculum in this area represent what Australian students should be taught in schools?

The curriculum documents under review are so vague as to provide an inadequate sense of their intended content. Where content is prescribed, it is often tendentious, parochial and biased more towards broad and fashionable social expedencies than any commitment to seeing young Australians taught the basics of these important disciplines.

In the documents under review, this is not so much of a problem in Dance and Drama where talented teachers will be able to pursue their own interests with their classes without violating the letter of the curriculum.

Media Arts, as I have noted, should not be a separate subject at all. I suspect the case is the same with Dance and Drama, though they certainly deserve a place in the extra-curricular life of schools and their pupils.

The music curriculum is particularly disappointing, and shows a very poor understanding of the need for incremental development of musical knowledge and experience amongst young pupils, and an even weaker understanding of the technical demands of the subject. Encouraging creative intuition in a technical vacuum is not enough.

Similar criticisms can be levelled at the Visual Arts curriculum, especially in terms of its lack of focus on traditional skills such as drawing and knowledge acquired through study of art history.

How does the intended Australian Curriculum in each subject area compare with that of high performing countries and those facing similar challenges?

Many foreign countries do not have national curriculums at all. Indeed, it remains a matter for question whether or not Australia will be better off with one of its own than without. Comparisons with the curriculums of England and South Korea suggest that the Australian model is well behind

both of these in terms of quality and clarity. The English curriculum is brief and concise, but nonetheless conveys a clear sense of the content areas to be covered at the appropriate stages. In South Korea, there is much more detail – but here too the detail is focused on specific areas of content, technique and practice, which are in general lacking from the Australian documents.

In every case, of course, a curriculum stands or falls in proportion to the quality of those teaching it.

Does the Australian Curriculum in this Area reflect what evidence based research suggests is a sound, rigorous and balanced curriculum?

No. My own evidence based research, gathered over a lifetime of teaching at the university level in the UK, and in schools in Australia, suggests that effective engagement with the arts must be grounded first on a serious and early foundation in technical skill and historical best practice, accompanied by constructively criticised opportunities for personal expression.

There is a general assumption running through all these curriculums that each child's intuitive expression moderated by the three cross-curriculum priorities is what matters most. It seems to be forgotten that no child can communicate effectively without tackling the demanding task of learning the appropriate techniques of communication. There is little point asking young people to respond, say, to music if they have not been taught in non-patronising detail what music is.

The general capabilities document is similarly unfocused and rambling. It characterises the aims of education in such abstract terms as to be impractical – even meaningless. Because we have a powerful commitment (one shared by the author) to seeing a society develop with the kinds of values adumbrated in the general capabilities and cross-curriculum priorities documents, we assume that what is taught in school must explicitly back these ideals. The assumption remains unexamined in these curriculums.

To take the example of the cross-curriculum priorities, these could far more effectively be integrated into the courses under discussion if recognised experts in relevant disciplines drew up a specific list of age-appropriate case-studies which could be introduced by appropriately trained teachers. As it stands, these priorities do violence to the sophistication of the individual areas concerned, and to the very cultures whose study the curriculum seeks to support. By insisting, for instance, that study wherever possible should begin with local indigenous contributions the authors of the curriculum at the same time isolate pupils from some of the most long-lived and highly valued achievements in the arts and patronise our extraordinarily complex indigenous cultures which most teachers will not be qualified to teach.

Because of their very vagueness, there is no doubt that these curriculum documents will prove extremely flexible in the hands of knowledgeable, well taught teachers. For others, they offer very little practical guidance as to the details of what should be taught. This has significant consequences for the possibility of fair and broadly-based assessment, which in any case I understand is to remain the responsibility of the states and territories.

11. The Arts (Foundation to Year 12) Ms Michele Chigwidden

Executive Summary

The purpose of this report is to provide:

- an analysis and evaluation across the Learning area Australian Curriculum: the Arts
- assess how the Australian Curriculum: The Arts compares with the curriculum of two other relevant countries, namely South Korea and England.

This entails the five subject areas within the learning area of the Arts and are as follows:

- Dance
- Drama
- Media Arts
- Music
- Visual Arts

The factors to be considered are:

1. Content of the learning area (as specified in the subject's content descriptions and content elaborations); relating to:
 - Robustness
 - Balance
 - Scope for choice and flexibility
2. Soundness of the general capabilities and achievement standards.
3. Appropriateness and relevance of the methodology to embed the three cross-curriculum priorities.
4. Extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.
5. Any significant treatment in the Australian Curriculum: The Arts document for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.
6. The curriculum documentation is friendly for students, teachers and parents and for development of accountability and recording measures.
7. Whether the curriculum for this learning area encourage love of learning, joy of discovery and a quest for knowledge and related skills.

My analysis and evaluation is set out in Part A of this report and is reported against the numbers above.

Initially, my impression was that each band seemed to have demands that I would expect for older students. After more analysis this is not the case. I don't necessarily still hold that opinion – so much rests with teacher discretion, judgment and training and development. This may initially incorporate

school based year level or band level moderation of student work. It is expected that the Australian Curriculum, Assessment and Reporting Authority (ACARA) will continue to provide training and development for the implementation of the Arts curriculum in addition to the continuous refinement of the curriculum. All students must be given opportunities to experience success.

I have a concern in regard to the delivery of the Arts curriculum. To cover the five Arts subjects over 2 years (ie within each band) is quite a challenge, especially the suggested range in the time quota from Foundation¹ to Year 6. In South Australia, the extra time for Year 7s could be accommodated however most secondary students (Years 8 – 10) would have 160 min/week for a semester. Senior secondary students (Years 11 – 12) eventually spend approximately 200 min/week for each semester. With the rigour in which the Arts curriculum presents, it is recommended that a review regarding more minutes per week for Foundation to Year 2 with a gradual increase of the time allocation up to the current 200 min/week, required for Years 11 and 12 be undertaken.

In regard to the ‘considering viewpoints’ within the content elaborations that have been included for all Arts subjects and are incorporated into the making strand. These are extremely helpful indicators as to how a teacher can work through a process for tasks and assess students’ engagement with the task. As stated in my comments for Dance 1.1 second dot point; when teachers use these suggestions however, their questions need to be relevant, pitched at the stage of development and not interfere with the natural progress of a task. Young students want to do and become frustrated with too much teacher talk.

In regard to cross-curriculum priorities: I would like to see some guidance as to the proportion of content or scope and sequence from all curriculum learning areas that is required to embed the three curriculum priorities. Consistent reference is given to the priority of Aboriginal and Torres Strait Islander Peoples (ATSIP) history and culture within the Arts bands and across all five Arts subjects. As stated previously, there’s no denying that this priority is relevant in the Arts, however if all the content descriptions are satisfied, there would be themes or topics associated with ATSIP history and culture that are at risk of being done to death. Frequent use of existing resources eg the film, Rabbit Proof Fence, are becoming a ‘turn off’ for students. Resources that reflect contemporary Aboriginal and Torres Strait Islander life, culture and issues needs investigation and development. Many icons indicate that all three cross-curriculum priorities are embedded in the content descriptions, however they are misleading.

Comparison with curricula in other jurisdictions

The Australian Curriculum: The Arts (particularly Visual Arts for the purposes of this comparison) is equally rigorous and comprehensive and, in regard to all five arts subjects, balanced when examining content and sequencing. It is clear and detailed, especially the content descriptions and content elaborations. The school curriculum of the Republic of Korea² contains elements that embrace its culture and eloquently describes rationale, aims and content of subject areas. However, it is quite prescriptive. The access available to teachers to view the framework of the Australian Curriculum on

¹ In South Australia, the first year of school is called Reception.

² Korean Ministry of Education and Human Resources (2009). Fine Arts Curriculum, accessed at: <http://www.ncic.go.kr/english.kri.org.inventoryList.do#>.

line and select specific views, glossaries, and guidance re understandings, knowledge and skills for example, make the document extremely user friendly. It seems quite difficult for the school curriculum of South Korea to be equally accessible.

The Australian Curriculum: The Arts is inclusive and allows flexibility of approach according to school situations.

The Australian Curriculum: The Arts clearly reflects the rigorous and exhaustive consultation process undertaken by ACARA. This particular learning area is still in its implementation stage, where there continues to be consultation, training and development as well as further refinements managed by classroom teachers.

Comparison with curricula in other jurisdictions shows that in England

Many points above apply to comparisons between the Australian Curriculum: The Arts and the National Curriculum in England.

In regard to the Australian Curriculum: The Arts, one finds that all aspects - from the Rationale and Aims to the learning area content descriptions and content elaborations and then subsequent descriptions of attainment levels - reflect scope and sequence that are thorough and intelligent. There is a consistency in respect to the essential descriptions of the two strands in the Arts, the 'glue' that keeps it all together:

Making – learning about and using knowledge, skills, techniques, processes, materials and technologies, to explore arts practices and make artworks that communicate ideas and intentions.

Responding – exploring, responding to, analysing and interpreting artworks.

This distinction is not evident in the National Curriculum in England.

There seems to be a distinct hierarchy of subjects in the National Curriculum in England. Heavy weighting to what are regarded as core subjects, especially English. Any weighting regarding subjects should be reflected in allocated time in the school day. There is a huge discrepancy regarding quality and amount of information available for teachers depending on the subject.

The balanced view of all five subjects within the Australian Curriculum: The Arts is absent in the National Curriculum in England. We communicate our culture and history through the Arts. Disappointingly, this is not explicit in the National Curriculum in England.

In addition to points made later in this report in relation to Dance and Drama, there is no mention of film, digital media or text (Media Arts) in the National Curriculum in England. Subject descriptors for Art and Design and Music are brief.

The National Curriculum in England is easy to read and follow the sequencing, except Attainment targets which are far too generic, and seems flimsy and lacking depth in regards to Arts subjects. Most of the guidance is implicit – leaving too much open to interpretation. Where the curriculum in South Korea is prescriptive, it seems that the curriculum in England is on the other end of the scale.

In summary, the Australian Curriculum: The Arts has received international recognition from the 'International Arts Education Standards: A Survey of the Arts Education Standards and practices of Fifteen Countries and Regions' prepared by the New York – based College Board for the National Coalition for Core Arts Standards³:

The Australian arts curriculum could be considered as exemplary in the breadth of its scope, the considerable attention to defining its own language, and the length it goes to in recognising the differences in abilities and learning opportunities at the different age/grade levels. It considers the importance of the arts in the roles they may play in other parts of the general curriculum: literacy, numeracy, critical thinking, cross cultural and environmental awareness, social and ethical development. Uniquely among the countries studied, it provides a link for a comprehensive documentation and explanation of the research that informs the curriculum.

The continued implementation of the Australian Curriculum: The Arts curriculum is essential to Arts education in Australia.

Preamble

The study of the arts offers richness to learning, confidence to explore, pride in achievement and opportunities to become 'an artist' not simply a passive 'spectator'.

Analysis is so broad for the arts with references to five learning areas – the proof of its success really is in the experience teachers have come to acknowledge through implementation of this curriculum and training and development with reporting expected to begin in 2015.

Personal teaching background: I am quite familiar and experienced teaching the Drama curriculum for 30+ years and working with Drama curriculum since its inception with the publication of *Images of Life: a handbook about drama in education*, R-12 / R-12 Drama Curriculum Committee, Education Department of South Australia (1981).

It is heartening to read the new Drama curriculum that has evolved and acknowledges the simplicity (with all its inherent complexities) of two strands of making and responding, as opposed to three strands of the past (making, performing, critical analysis).

Recently I have taught Visual Arts and am very much a novice. My experience with Dance, Media Arts and Music has been very much incidental to my teaching of Drama which has been a natural extension to my program or simply because students have wanted to experience and dabble in these areas.

The Arts curriculum has to be more than dabbling of course.

I am fascinated by the breadth of the arts learning area and get excited reading the content descriptions and elaborations. It will be a challenge for a classroom teacher and/or specialist teacher to cover the arts curriculum without integration of the five arts forms with other learning areas,

³ The College Board, *International Arts Education Standards: A survey of the arts education standards and practices of fifteen countries and regions*, New York, NY, August 2011 can be accessed at [http://nccas.wikispaces.com/file/view/int'l%20standards%208%201%20\(final\).pdf](http://nccas.wikispaces.com/file/view/int'l%20standards%208%201%20(final).pdf) (viewed 10 July 2014).

especially in the early years and middle primary years. This is probably more achievable in the secondary situation due to requirements of the different curriculum choices and different timetabling structures.

Primary schools may need to outsource specialist teachers or integrate an Artist in Residence program to satisfy the requirements of the Australian Curriculum: The Arts. Not all schools have the funding or community support for these ventures and I fear that these programs could become piecemeal and driven by expectation of a formula rather than for enrichment that any of the five art forms, individually or in conjunction, can provide.

As I have read, researched, analysed and evaluated the content descriptions and content elaborations of the five Arts subjects, I have made comments that are both specific to a particular arts subject and are equally applicable to the other four Arts subjects. Specific examples have been cited to explain my comments. These examples vary from Arts subject to Arts subject and reflect my reactions, ah-ha moments or otherwise as I have read this curriculum document.

PART A: ANALYSIS AND EVALUATION

1. Dance

The comments below are reported against the seven factors to be considered as outlined on page 258.

1.1

- Robustness, balance of activities (apart from considering viewpoints) are linked to content, scope for choice and flexibility and are sound.
- Terminology of content elaborations for band F – 2 seems quite technical, especially ‘considering viewpoints’. Teachers need to be aware that the content elaborations are suggestions about how content might be covered and is advice that can be considered by teachers – this advice is not mandatory.
- Young learners need scaffolding to ‘consider viewpoints’. These seem to be more responding rather than making. Children this age really want to do rather than talk about it. Learning is experiential ie not driven by too much teacher talk. Reflection is certainly helpful to teachers and students at this band however balance is the key.
- Re making and responding strands: content descriptions fit nicely within the scope and sequence. The ratio of the making strand to the responding strand is balanced, even though in Foundation to Year 6 it is 3:1 and in Years 7 to 10 it is 5:2. This ratio realistically reflects what children like to do, they want to be doing in the Arts (see Drama in 2.1).
- Content elaborations clear and specific. The Arts curriculum would benefit from additional and specific references to Asian and European examples. If teachers are to include ATSIP culture at every band, the inclusion needs to be relevant to students for example, young learners could, look at how children their age participate in Aboriginal and Torres Strait Islander dance/ceremonies as part of their culture.
- Structure and Sequencing clear, obvious progress, although the technical language for early and middle primary is not so user friendly on first reading. The content descriptions and

elaborations for Years 7 to 10 seem more relevant to older children and seem better matched for rigours of Dance at this stage of schooling.

1.2

- Foundation to Year 2 achievement standard can only be achieved by Year 2 – this is implicit in all bands however in light of Early Years Learning framework, activities embedded into the sequence of this band should allow success in Year 1. Three years of this band in Dance, and in fact other Arts subjects, is tough. In light of once-only Foundation intake (students must turn five years of age by the May 1st) it would be helpful to have additional and specific content descriptions and elaborations for Foundation, leaving the first band as Years 1 – 2.
- General capabilities and achievement standards offer relevant links to curriculum content in the learning area for this particular arts subject.

1.3

- It is most appropriate to embed cross-curriculum priorities in relation to ATSI history and culture and Asia and Australia's engagement with Asia in particular. A peoples' culture is defined by its Arts.
- In Dance, whilst all content descriptors that identify relevance with sustainability are 'doable' – it seems a bit of stretch that these activities for bands Foundation to Year 2, Years 3 – 4 and Years 5 – 6 are implicitly appropriate. Using the context of sustainability would have to be quite explicit and relevant to students.

1.4

- Essentially, a space, music source (but not always), dancers and audience are the bare basics for dance to happen; all of which can be provided for dance curriculum to be delivered. The nature of the space as a safe environment is of paramount consideration.

1.5

- This curriculum area, along with other learning areas, has been established with a quality process that considered many factors and submissions with significant teacher input. Specific criteria to frame the evaluation of the draft curriculum through each stage of the development process (including feedback) have been used.
- This was established on a strong evidence base that entailed pedagogical and epistemological characteristics; as simply as the way the arts learning area can draw together each of the five art forms as both a specific art form body of skills and as a methodology to the more demanding philosophy of 'examining past, current and emerging arts practices in each art form across a range of cultures and places'.
- Evidence of explicit and implicit assessment in this curriculum document is found in the content elaborations, eg ACADAM010 or ACADAR012 (Band 5 and 6) and achievement standards. These are clear and concise and are a natural extension of engagement and explicit teaching. In South Australia, this has been promoted by the South Australian

Teaching for Effective Learning framework (Tfel) training and development process in the area of engagement. This applies equally to all five Arts subjects.

- Foundation to Year 2: 'technical' vocabulary more relevant to teachers – would obviously need alternative vocab with students so that they understand what they need to demonstrate. This would also apply to a lesser extent for older children. Essentially, it is always up to the teacher to translate aims and requirements of tasks so that students and parents have a grasp of what is assessed which can be reflected on relevant rubrics for example. It is important to point out that it is unusual to find a dance specialist in Foundation to Year 7 schools. Most primary schools would have to outsource a dance specialist.
- The scope and sequence for bands F – 2, 3 – 4 and 5 – 6 allow for clear assessment and reporting practice (and thus accountability) and demonstrate intelligent progress of content descriptions from 1) 'exploring ideas and improvising with ways to represent ideas' to 2) 'developing and understanding of practices' to 3) 'sharing artworks through performance, presentation or display' (all of which are making activities) and finally 4) 'responding to and interpreting artworks' (responding).
- For bands 7 – 8 and 9 – 10 descriptions include 1) and 3) and 4) with additional descriptions of 'manipulating and applying the elements/concepts with intent', 'developing and refining understanding of skills and techniques' and 'structuring and organising ideas into form' as making activities and an additional responding activity 'analysing and reflecting upon intentions'.

1.7

- Children are naturally engaged with the arts – with Dance in particular. Foundation to Year 4 students love the playfulness of dance; they start moving as soon as they hear any type of music and then older children relate easily because popular music is a huge part of their psyche. The Dance curriculum provides a challenge of learning and achievement of new skills in dance. Students have the opportunity to make sense of the structure and historical context of dance and respond to the variety of dance styles and intentions. It clearly encourages a love of learning, the joy of discovery and the quest for knowledge and related skills.

2. Drama

The comments below are reported against the seven factors to be considered as outlined on page 258.

2.1

- As for Dance, re making and responding strands: content descriptions are balanced even though ratio of content descriptors of making to responding in Foundation to Year 6 is 3:1 and in Years 7-10 is 5:2. Students want to make and do it in the arts. Students want to be actively involved and enjoy the group process and moments of sharing and presenting – they often comment, 'when are we going to do Drama?' when there's too much 'chalk and talk'. In Years 8 – 10 they feel bogged down with 'theory' however a research task with clear

learning intentions and assessment criteria can be both a making and responding task without too much teacher talk.

- ‘Considering viewpoints’ is part and parcel of drama programs – these descriptions are specific to each content description and integrates the making and responding strands and can include group or individual peer assessment. An effective assessment tool. As for Dance, this has to be balanced.
- ‘Considering viewpoints’ in band 3 and 4 do entail considerable teaching of theatre history/cultural background eg ACADRM033 and ACADRR034 and would need to have a link, for example, with history subjects to work within the time available.
- To achieve balance in band descriptions it would be helpful to include additional reference to history of Australian and European drama, as acknowledgement of the specific and eclectic influences of these global cultural traditions. Their omission would tend to limit scope for choice and flexibility. There seems to be an emphasis on just ATSIP and Asian ‘theatrical’ traditions in bands 7 and 8 and 9 and 10. Content elaborations are balanced and do give teachers helpful advice and choice: however the scope of theatre history/influences needs specific reference in band descriptions as a more comprehensive introduction to theatre history.

2.2

- General capabilities across all bands offer scope to enrich activities. The inclusion of Numeracy and Intercultural understanding in some activities don’t necessarily meld into many skill based activities and would need to be quite explicit in program sequencing for some bands.
- Breadth of achievement standards across all bands is clear and concise and linked to curriculum content.
- Foundation to Year 2 achievement standards are a particularly helpful guide for teachers – students just want to have fun.

2.3

- The ACARA guidelines on cross-curriculum priorities are successful in defining and advising teachers about embedding these priorities into the Arts learning area curriculum. They are appropriate and must be relevant if there is to be engagement and impact. The arts subject – Drama allows use of different methodology and approaches to achieve this.

2.4

- For Drama to happen all that is needed is a space, an actor, audience. Clearly schools would want additional resources, which are selected according to need and the school’s context, let alone wishing to deliver the curriculum to different stages of schooling.

2.5

- See Dance comments - Evidence of explicit and implicit assessment in this curriculum document is found in Drama content elaborations, eg ACADRM048 or ACADRR053 (Band 9 and 10) and achievement standards.

2.6

- See Dance 1.6 points 2,3 and 4.

2.7

- Student's natural engagement with the arts – and Drama in particular, make teaching Drama a joy. I have been in the fortunate position of being greeted by students who smile, are quite excited by their drama sessions and are eager to participate. Students enjoy the group dynamics of Drama and as their confidence improves (because they are continually 'doing') they enjoy the challenges of performing by themselves and presenting their ideas in new and different ways. The Drama curriculum provides many opportunities for learning and achievement of new skills. Students have the opportunity to make sense of the structure and historical context of Drama and respond to the variety of theatre styles and intentions. It clearly encourages a love of learning, the joy of discovery and the quest for knowledge and related skills.

3. Media Arts

The comments below are reported against the seven factors to be considered as outlined on page 258.

3.1

- Robustness, especially structure and sequencing, detail, clarity and evidence of a foundation of aims, values and principles are sound. Balance of activities with their scope for choice and flexibility are evident. Many activities as suggested in content elaborations are used in classrooms frequently and successfully. Media Arts, prior to the Australian Curriculum: The Arts, has been used as a means to an end, especially Foundation to Year 7. Really exciting to note it as an Arts subject in its own right.
- As for Dance and Drama, re making and responding strands: again, content descriptions are balanced even though ratio of content descriptions of making to responding in Foundation to Year 6 is 3:1 and in Years 7-10 is 5:2. Students want to make and do it in the arts. Students want to be actively involved and enjoy the group process and moments of sharing and presenting.
- Media Arts is so 21st century – students love activities that connect so explicitly with their world.
- As for comments re Foundation to Year 2 for Dance and Drama, perhaps too technical, however the emphasis on storytelling, sound and image well matched to early learners.

3.2

- General capabilities are easily linked with the curriculum content in Media Arts – they are essential as a basis for student process and progress in this subject.
- Achievement standards are sequenced appropriately.

3.3

- The ACARA guidelines on cross-curriculum priorities are successful in defining and advising teachers about embedding these priorities into the Arts learning area curriculum. They are appropriate and must be relevant if there is to be engagement and impact. The arts subject – Media Arts curriculum, allows use of different methodology and approaches to achieve this and when combined with any of the other four Arts subjects, teachers are able to produce exciting and relevant programs.

3.4

- Media Arts clearly needs specialised resources and software. Schools need to make careful decisions about the nature and use of these resources to ensure technologies are used efficiently to achieve the core content. Schools have a responsibility to allow for the Media Arts curriculum to happen within the school's context and different stages of schooling by ensuring teacher and student access to these technologies and software. A challenge for schools remains the resourcing of a robust computer network, hardware and software peripherals and technical support.

3.5

- See previous comments as for Dance, dot points 1 and 2.
- As with Dance and Drama comments - evidence of explicit and implicit assessment in this curriculum document is found in Media Arts content elaborations, eg ACAMAM070 or ACAMAR072 (Band 7 and 8) and achievement standards.

3.6

- As with Dance 1.6 dot points 2,3 and 4 apply to Media Arts also.
- Students are quite excited about working with 21st century technologies. Teachers, students and parents alike enjoy the 'hands on' approach with activities in this curriculum. The content descriptions allow for 'tried and true' activities using media such as newspapers, clay animation etc but also moves these activities into the twenty-first century by using word documents, formatting, publishing and applications on ipads to achieve outcomes that are relevant today.
- References to maintaining safety in the use of technologies, development of ethical practices and regulatory issues and understanding of media conventions is responsible and ensures accountability.

3.7

- Students love their gadgets and they love social media. Media Arts allows for responsible, creative and imaginative use of 21st century technologies. Using these resources does not encourage short lived and fleeting trends. What it does encourage is that students do not become passive in their relationship with media; rather they become a discerning and critical ‘artist’ or audience.

4. Music

The comments below are reported against the seven factors to be considered as outlined on page 258.

4.1

- In relation to robustness, the academic rigour in the Music curriculum is quite significant. Of all the Arts subjects, Music seems to be quite prescriptive; the structure and sequence is clear and detailed. It is very much a curriculum that develops step by step (not surprisingly as what is found in the mathematics curriculum). Content descriptions and content elaborations are directly linked to the foundation of aims, values and principals.
- Balance and scope for choices and flexibility are evident, especially in the Band descriptions, however the Band descriptions and content elaborations need specific references to all of the three cross-curriculum priorities. There continues to be an emphasis on ATSIP histories and culture with only passing reference to the Asian region in band descriptions. Advice to teachers needs inclusion of examples relating to Asia and Australia’s engagement with Asia and sustainability, especially when the content description makes reference to any or all of these cross-curriculum priorities in the codes eg ACAMUM085 and ACAMUR087 (band 3 and 4) and yet the content elaborations don’t refer to all three. Provision of fresh and new resources for the teaching of ATSIP are essential to avoid teachers going over the same ground year after year which eventually negates the impact of including this cross-curriculum area.

4.2

- It seems that together with Dance, Music also relies on specialist teachers to deliver the Music curriculum, after band 3 - 4. While the achievement standards are suitably general and clear about what a student needs to achieve, its link to the content descriptions and elaborations are misleading because here the curriculum is significantly technical – I’m not sure that a generalist classroom teacher would feel confident delivering this curriculum.

4.3

- Generally, appropriateness and relevance has been achieved however it is selective. See note 4.1 above, dot point 2: content elaborations do not advise teachers about embedding two of the three cross-curriculum priorities – alternative approaches need to be included.

4.4

- The core content in this arts subject allows for flexibility in classroom delivery up until band 3 and 4. For band 5 and 6 up to band 9 and 10, specialist resources, instruments and classrooms are required, usually by a specialist teacher as the structure and sequence dictates.

4.5

- Many examples are found in this learning area where there is significant treatment related to explicit and implicit assessment. Bands F – 2, use the Early Years Learning Framework to facilitate purposeful play in structured activities. These activities are both highly structured with close attention to specific skills that children learn and demonstrate (allowing explicit assessment) and allowing teachers, with observation and teacher judgement, to assess other aspects of a student's development such as the degree of exploration and experimentation, which lends itself to implicit assessment. Content descriptions such as ACAMUM080 and ACAMUM082 (band F – 2) exemplify this.
- Many examples of pedagogical and epistemological characteristics are evident within the curriculum – structure and sequence of content descriptions along with the scope and sequence by band. Identification of knowledge, understanding and skills are linked to child development.

4.6

- Documentation of Music curriculum is user friendly for teachers to the end of band 3 and 4. For additional bands generalist teachers would need support with training and development. Specialist Music teachers have their place however this practice could give an artificiality to activities because of limited access to the 'music' teacher. There would be limited opportunities for the making strands in cross-Arts curriculum activities, let alone links with the general capabilities.
- This curriculum appeals to students and parents – music has had a long-standing status in our curriculum, it has become quite established and is prestigious amongst Arts subjects.
- Accountability and reporting measures have been accommodated in a scope and sequence excel spreadsheet and as such, can efficiently satisfy accountability and reporting in a clear and concise manner.

4.7

- Just as children move and want to dance when they hear music, they also love to sing and beat a box or play an air guitar. Students view music as very much a part of their lives – they connect with it in a multitude of ways.
- As stated in the Music Rationale and Aims: 'as students progress through studying Music, they learn to value and appreciate the power of music to transform the heart, soul, mind and spirit of the individual' – thus students develop an artistic appreciation and enjoyment of music as both an artist and a listener.

5. Visual Arts

The comments below are reported against the seven factors to be considered as outlined on page 258.

5.1

- Robustness of documentation has all the requirements – rigour, structure and sequence, detail, clarity, succinctness (sometimes this needs re-reading a few times for the inexperienced) and evidence of relatedness to aims, values and principles.
- It is a balanced curriculum document – no mean feat when within the Visual Arts (which is one of five Arts subjects), it includes the fields of art, craft and design (subjects in their own right!).
- Scope for choice and flexibility is quite comprehensive.

5.2

- General capabilities and achievement standards are directly linked to curriculum content. There is a strong sense of the intelligence of these links; they relate to a student's stage of development (band descriptors) through to the content descriptions and content elaborations and finally achievement standards. The reader has a sense of being led step by step through a comprehensive process.

5.3

- Particularly appropriate and relevant, the Visual Arts curriculum's use of methodology to embed the three cross-curriculum priorities is sound. As with other content descriptions for Dance, Drama, Media Arts and Music, there appears to be an imbalance because of the frequent references to ATSIP histories and culture in the content descriptions and elaborations. There is a risk of trotting out dot paintings year after year. Inclusion here is certainly justified, however little reference is made to Asia and Australia's engagement with Asia, which has a rich Visual Arts connection. Of all the Arts five subjects, Visual Arts lends itself successfully to embedding sustainability – as either a theme or topic and as a practice.

5.4

- Content delivery in this document is quite detailed and allows flexibility in classroom delivery. Different themes, techniques within the fields of art, craft or design can be chosen to drive choices of resources, according to teacher discretion to suit the task and students' developmental stage. The document gives clear indicators that suit different school contexts and different stage of schooling.

5.5

- Many content descriptions and content elaborations allow opportunities for a range of assessment formats. Explicit and implicit assessment are an appropriate vehicle in continuous assessment of student work from creating a brief to ideation through to process

of making, presenting and reflecting. Content descriptions such as ACAVAM125, ACAVAM127 and ACAVAR130 (bands 9 and 10) demonstrate this. The content elaborations, by the very nature of Visual Arts, are embedded in pedagogical and epistemological characteristics.

5.6

- Extremely user friendly for teachers, students and parents. It is the teacher's responsibility to use appropriate and relevant vocabulary to explain tasks to students, which are explained in terms of students' stage of schooling. This allows for development of accountability and reporting measures that are constructed to reflect the aims of these tasks, to demonstrate what and how this has happened and report accordingly.

5.7

- Primary children naturally love colour, pattern and representing their world in pictures. They have a natural curiosity, ('how do I do that?', 'what's that?'), a genuine appreciation of artworks ('wow', 'that's awesome'), an unassuming assessment of what they like or don't like and a confidence to give it try it for themselves. Older children, even though they can be typically more 'reserved', love their art and love creating all sorts of projects that express their ideas. The curriculum documentation for Visual Arts gives a structure to the opportunities and choices that students have to do all these things.

PART B: National Curriculum of Korea (The School Curriculum of the Republic of Korea) (NCoK) and the Australian Curriculum: The Arts (ACA)

Schooling in South Korea – Context

- The education system in South Korea is regarded as the second best in the world (following Finland).
- In reference to an analysis of, and comparison of, curriculum, I was unable to find any references in the School Curriculum of the Republic of Korea to the broad range of arts subjects (ie Dance, Drama, Media Arts, Music and Visual Arts) as documented in the Australian Curriculum: The Arts.
- Essentially, the only Arts subjects that South Korea offers as core subjects are Music and Fine Arts : these are taught in Elementary, Middle and Junior High School (compulsory years) and then students get an opportunity to attend a senior high school, which is classified as either general/academic, vocational/technical or specialist/special purpose. These schools might have arts specific subjects.
- There is quite a prescriptive curriculum with core subjects and little choice of elective subjects until the end of junior high school (compulsory years of schooling); however schools seem to have significant autonomy with the evaluation of the suitability, validity and effectiveness of the school's curriculum organisation and implementation and through their review process, puts in place improvements the following year.

- Time allocation for the arts, which is shared between the two subjects of Fine Arts and Music, is equal second 3rd/4th grades to 5th/6th grades of Elementary. In Middle School is equal fourth. This guide is to be used over 2 years; the school year comprises 34 weeks. This equates to approximately 2.5 hours per week for Fine Arts and Music collectively. This compares to 1.1 hours per week in the Arts for Foundation to Year 2, 1.3 hours per week for Years 3 – 6 and 2.1 hours per week (two of the Arts subjects) for Years 7 -10.
- In South Korea, there is an opportunity for elective subjects in Senior High School where a school is able to offer two or more subjects and this includes a cluster of subjects called Liberal Arts, however it has been difficult to research the content of subjects included in this cluster and therefore I'm unable to make specific comments re the inclusion of Arts subjects in the curriculum.
- There seem to be some specialised arts subjects which may be included in curriculum in Senior High School – these include Multimedia, Basic Cartoon Animation, Animation Production, Cartoon Creation, Film Production, Filming and Lighting and Broadcasting – these bridge the arts subjects of Media Arts and Visual Arts in varying capacities. References are also made to Introduction to Drama, Stage techniques, Acting, Drama Production, Drama Critiquing; likewise with Movies and Photography.
- It is at the discretion of individual schools which subjects are offered. Again, it has been difficult to research the curriculum content of these subjects.
- References are made to 'creative experiential learning activities' throughout the curriculum document for Elementary, Middle and Junior High School, which include activities grouped under Autonomous Activities. I have assumed that these activities include a broader approach to including arts subjects, however it has been difficult to source the annex 18 in the National Curriculum of South Korea, which refers to these activities.
- These creative experiential learning activities are included in the schools' annual review and evaluation of contents and skills, achievement and methodology.
- Not unlike the Early Years Learning Framework (South Australia), where the overriding elements are Being, Becoming and Belonging, in South Korea, children starting school do an integrated subject called We are the First Graders focusing on daily life for students to adapt themselves to a new school life.
- This integrated subject is organised into four main themes with content as follows:
 - Familiar school life – recognising features of my school, my classroom and using facilities including play equipment and rides
 - Disciplined school life – safe living, clean living, independence and polite greeting
 - Pleasant school life – introducing myself, making friends, caring for others, living together
 - Intelligent school life – listening and speaking with proper posture, using learning tools, drawing lines, painting
- The content structure is detailed, as are the Teaching and Learning methods and Evaluation guidelines. The use of Drama and Media resources are encouraged to accomplish content objectives.
- The philosophy that underpins these themes is intrinsically connected to South Korean 'culture of education' and I make this reference because I believe that it may be overly

rigorous with the requirement that first graders will learn the requirements of We are the First graders ‘within the first month in the first semester’.

- The prescriptive nature of We are the First Graders does not allow for reflection, for questioning or for change by teachers. It is concerning that there seems to be only one way to provide for children’s learning at this crucial beginning stage.
- It certainly sets the benchmark for what is expected for the rest of a child’s school life. With a 34 week school year, it has been referenced as students typically undertaking 220 days a year, which equates to 13 hours per day when supplementary tutoring is factored in.
- There was a major overhaul of the curriculum in 1998 (with revisions in 2009 and 2012) because the government wanted to reduce the emphasis on rote teaching methodologies. The revisions have focused on 1) promoting individual learning pathways, 2) the reduction of study loads and 3) the nurturing of creative thinking.
- Certainly, the Australian Curriculum: The Arts include 1) and 3) above to an exemplary standard.
- I have a sense that the National Curriculum of South Korea, whilst exciting, challenging and eloquent and steeped in its fine culture is significantly prescriptive; the structure of schooling in South Korea has a sameness to it up to the end of junior high school and does not seem to consider the different contexts of schools. There doesn’t seem to be the variety of school contexts as there are in Australia, whether that be multicultural, geographic or socio-economic contexts for example.
- For the purposes of the evaluation of the content NCoK, my focus is on Fine Arts.

Table 11.1: Fine Arts comparison to Australian Curriculum: The Arts (Visual Arts)

South Korea – Fine Arts	Australian Curriculum: The Arts (Visual Arts)
RATIONALE	
<p>Through Fine Arts one can visually express feelings and thoughts, communicate with others through visual images, and understand the world as well as oneself. Since art records and reflects the culture of a specific time and place, we can understand the past and the present through art culture and, furthermore, contribute to the development and creation of culture.</p> <p>Fine Arts education improves aesthetic attitude and expression, imagination, creativity, and critical thinking so one can understand and enjoy the beauty of visual artifacts.</p>	<p><i>(Visual Arts includes the fields of art, craft and design) students make and respond using visual arts knowledge, understanding and skills to represent meaning associated with personal and global views ...Visual Arts engages students in a journey of discovery, experimentation and problem-solving relevant to visual perception and visual language. Students undertake this journey by utilising visual techniques, technologies, practices and processes..... students become increasingly confident and proficient in achieving their personal visual aesthetic, and appreciate and value that of others</i></p>
<p>Comparison: Similar approach from the broad perspective. Outlines of essential understanding, knowledge and skills of Fine Arts / Visual Arts have lots of similarities.</p>	

AIMS	
<p>Fine Arts education aims to nurture whole individuals who understand, inherit, and improve art culture by learning to express themselves creatively through various art experiences, art making and art appreciation. Students develop:</p> <ul style="list-style-type: none"> • Aesthetic sensitivity – includes art activities that involve the exploration, inquiry, understanding and judgment of nature and visual culture • Creative expression – student expression of feelings and thoughts through their art works and processes required • Critique skills – cognitive approach to art, students develop knowledge and attitude needed for the understanding, criticism and enjoyment of art culture • Ability and attitude of appreciating art culture – students develop a respectful attitude toward art culture. 	<p>Visual Arts: students create visual representations that communicate, challenge and express their own and others' ideas as artist and audience..... visual arts has the capacity to engage, inspire and enrich the lives of students, encouraging them to reach their creative and intellectual potential by igniting informed, imaginative and innovative thinking. Visual Arts knowledge, understanding and skills ensure that, individually and collaboratively, students develop:</p> <ul style="list-style-type: none"> • Visual arts techniques, materials, processes and technologies • Critical and creative thinking, using visual arts languages, theories and practices to apply aesthetic judgment • Respect for and acknowledgement of the diverse roles, innovations, traditions, histories and cultures of artists, craftspeople and designers; visual arts as social and cultural practices; and industry as artists and audiences • Confidence, curiosity, imagination and enjoyment and develop a personal aesthetic through engagement with visual arts making and ways of representing and communicating.
<p>Comparison: Student centeredness is at the heart of both curricula 'the whole individual'. Basically identical in focus on essential development of knowledge, understanding and skills. Australian Curriculum: The Arts - Visual Arts outline seems to allow for more individuality – reminded of 'their own and others' ideas as artist and audience' (from Rationale and Aims).</p>	
OBJECTIVES/ACHIEVEMENT STANDARDS	
<p>F- 2: entirely different curriculum</p> <p>3rd – 4th grades: Students develop an interest and concern with visual objects and phenomena. Students develop an interest and concern with art expression and production. Students have an interest in artwork and art culture.</p> <p>5th – 6th grades: Students discover the aesthetic attributes of visual objects and phenomena. Students learn the basics of expression and art production through various activities. Students analyse artwork, and understand the importance of art culture. Middle School: Students understand the different functions and roles of art in life. Students plan and apply art expression in</p>	<p>Foundation to Year 2: Students describe artworks they make and view and where and why artworks are made and presented. Students make artworks in different forms to express their ideas, observations and imagination, using different techniques and processes.</p> <p>By the end of Year 4, students describe and discuss similarities and differences between artworks they make, present and view. They discuss how they and others use visual conventions in artworks.</p> <p>Students collaborate to plan and make artworks that are inspired by artworks they experience. They use visual conventions, techniques and processes to communicate their ideas.</p> <p>By the end of Year 6, students explain how ideas</p>

<p>accordance with purposes and intentions. Students contextually interpret artworks, and understand the meaning of art culture.</p> <p>Junior High School: Students understand the meaning of art in life and judge its value. Students creatively express and communicate through experimentation and the expansion of art expression and production. Students make judgments about artwork, and participate in art culture.</p>	<p>are represented in artworks they make and view. They describe the influences of artworks and practices from different cultures, times and places on their art making.</p> <p>Students use visual conventions and visual arts practices to express a personal view in their artworks. They demonstrate different techniques and processes in planning and making artworks. They describe how the display of artworks enhances meaning for an audience.</p> <p>By the end of Year 8, students identify and analyse how other artists use visual conventions and viewpoints to communicate ideas and apply this knowledge in their art-making. They explain how an artwork is displayed to enhance its meaning. They evaluate how they and others are influenced by artworks from different cultures, times and places.</p> <p>Students plan their art-making in response to exploration of techniques and processes used in their own and others' artworks. They demonstrate use of visual conventions, techniques and processes to communicate meaning in their artworks.</p> <p>By the end of Year 10, students evaluate how representations communicate artistic intentions in artworks they make and view. They evaluate artworks and displays from different cultures, times and places. They analyse connections between visual conventions, practices and viewpoints that represent their own and others' ideas. They identify influences of other artists' on their own artworks.</p> <p>Students manipulate materials, techniques and processes to develop and refine techniques and processes to represent ideas and subject matter in their artworks.</p>
<p>Comparison: The Australian Curriculum – The Arts (Visual Arts) is detailed, precise and demonstrates a clear progression. Teachers in Australia are able to access examples of Knowledge and Skills in the curriculum, which in addition to content elaborations, give clear indicators of what to include and standard. A teacher in South Korea would find that while there is a clear progression, a lot is open to interpretation with little guidance to achievement standards. (This is based on the curriculum guidelines that have been provided.)</p>	
<p>CONTENT STRUCTURE</p>	
<p>Aesthetic experience</p> <ul style="list-style-type: none"> Natural environments Visual cultural environments 	<p>Strands: <i>Making</i></p> <ul style="list-style-type: none"> Exploring ideas and improvising with ways to represent ideas.

Art production <ul style="list-style-type: none"> • Thematic expression • Techniques • Art elements and principles • Processes Art appreciation <ul style="list-style-type: none"> • Artworks • Art culture 	<ul style="list-style-type: none"> • Developing understanding of practices • Sharing artworks through performance, presentation or display Responding <ul style="list-style-type: none"> • Responding to and interpreting artworks
Comparison: Both curricula encompass what is essential to the teaching of Fine Arts / Visual Arts. The Australian Curriculum offers specific focus.	
CONTENT ELEMENTS/CONTENT DESCRIPTIONS⁴	
3rd/4th grades: <ul style="list-style-type: none"> • Expression by experimenting with basic materials, tools, techniques 	By Year 4: Use materials, techniques and processes to explore visual conventions when making artworks (ACAVAM111)
3rd/4th grades: <ul style="list-style-type: none"> • Having an interest in understanding and appreciating artworks • Having an interest in art culture 	By Year 4: Identify intended purposes and meanings of artworks using visual arts terminology to compare artworks, starting with visual artworks in Australia including visual artworks of Aboriginal and Torres Strait Islander Peoples (ACAVAR113)
Comparison: There are assumptions about intended teaching in NCoK; Visual Arts content descriptions are quite explicit which a) encourages explicit teaching and b) makes particular reference to Australian Indigenous culture. Teachers also can apply this content description to include reference to artworks from Asian and European cultures. Content elaborations also give teachers a huge scope in approaches to pedagogy. NCoK does not seem to specify application to cultures other than that of South Korea and again, quite broad in interpretation.	
5th/6th grades: <ul style="list-style-type: none"> • Understanding the characteristics of different expressions and learning different methods 	By Year 6: Develop and apply techniques and processes when making their artworks (ACAVAM115)
5th/6th grades: <ul style="list-style-type: none"> • Analysing the characteristics of artworks and appreciating them. • Understanding the characteristics and importance of art culture. 	By Year 6: Explain how visual arts conventions communicate meaning by comparing artworks from different social, cultural and historical contexts, including Aboriginal and Torres Strait Islander artworks (ACAVAR117)
Comparison: As above for 3 rd /4 th grades and Years 3 – 4, there is a clear sense of development and sequence in both NCoK and ACABA. Again, it seems that there is little reference to the world outside of South Korea in respect to exploring and appreciating art culture. The scope of the Teaching and Learning Methods and Evaluation in the NCoK is inclusive and explicit. Whilst there is not a comparative section in the Australian Curriculum: The Arts, the Rationale and Aims of the Arts, and specifically that of each of the five Arts subjects, implicitly require the very same teaching and learning and assessing methods as those stated in the NCoK. There does not seem to be anything particularly complex or innovative about these two sections of the document.	

⁴ By way of specific comparison, I'll focus on one *making* (Developing understanding of practices) in the ACABA to Art Production – Techniques (NCoK) and one *responding* (Responding to and interpreting artworks) (ACABA) to Art appreciation – Art culture (NCoK).

The National Curriculum in England (NCiE) and the Australian Curriculum: The Arts (ACA)

Schooling in England – Context

- Interesting points of comparison with an analysis of the National Curriculum in England. Schools are required to ‘... offer a curriculum which is balanced and broadly based and which promotes the spiritual, moral, cultural, mental and physical development of pupils at the school and of society, and prepares pupils at the school for the opportunities, responsibilities and experiences of later life.’
- Dot points below are quoted directly from the NCiE:
 - A distinction is made between the school curriculum that comprises all learning and other experiences that each school plans for its pupils and the national curriculum that forms ‘one part of the school curriculum’, however it is also a legal requirement that schools follow ‘the statutory national curriculum which sets out in programmes of study, on the basis of key stages, subject content for those subjects that should be taught to all pupils’.
 - All state schools are also required to make provision for a daily act of collective worship and must teach religious education to pupils at every key stage and sex and relationship education to pupils in secondary education.
 - All schools should make provision for personal, social, health and economic education (PSHE), drawing on good practice. Schools are also free to include other subjects or topics of their choice in planning and designing their own programme of education.
 - The national curriculum provides pupils with an **introduction to the essential knowledge** that they need to be educated citizens. It introduces pupils to the best that has been thought and said; and helps engender an appreciation of human creativity and achievement.
 - The national curriculum is just **one element** in the education of every child. There is time and space in the school day and in each week, term and year to range beyond the national curriculum specifications. The national curriculum provides an outline of core knowledge around which teachers can develop **exciting and stimulating lessons** to promote **the development of pupils’ knowledge, understanding and skills as part of the wider school curriculum.**⁵
- Structure of curriculum described in terms of 4 key stages: 12 subjects are offered which comprise of 3 core subjects (English, mathematics and science) and 9 foundation subjects, two of which are Art and Design and Music)
 - A key stage is a stage of the state education system and sets the educational knowledge expected of students at various ages. These are:
 - Key Stage 0: for 3-5 year olds – one year of which is compulsory (Reception)
 - Key Stage 1: for 5-7 year olds – Year 1 – 2
 - Key Stage 2: for 7-11 year olds – Year 3 – 6

⁵ All the above “bold” phrases have resonance with the Australian Curriculum

- Key Stage 3: for 11-14 year olds – Years 7 – 9
- Key Stage 4: for 14-16 year olds – Years 10 – 11
- Key Stage 5: for 16-18 year olds – Years 12 – 13
- The NCiE sets out targets to be achieved in various subject areas at each of the key stages, however in regard to Arts subjects within the NCiE, there is no guidance on Drama and Dance as stand alone subjects or Film or Creative digital media – but these will continue to be offered as General Certificate of Secondary Education (GCSEs) subjects (Key Stage 4) and will be revised alongside all GCSEs from 2015.
- There is reference to the Arts in relation to Key Stage 4 entitlement areas. Here the NCiE states that the Arts (comprising Art and Design, Music, Drama, Dance and Media Arts) in addition to Design and Technology, the Humanities (Geography and History) and Modern Foreign Language are not compulsory after 14 years (modern) however it is a statutory requirement that schools must provide access to a minimum of one course in each of the entitlement areas and that an opportunity must be provided to students should they wish to take a course in all four areas. Essentially, it's about how schools in England choose to define their offer within the entitlement areas.
- This is comparable to the range of subjects offered to students - post-compulsory - in Australia, however the subject choices for Years 11 and 12 are broader.
- Disappointingly, in the NCiE, Dance is only mentioned in the Physical Education curriculum. References are minimal as demonstrated in the table below.

Table 11.2: Comparison to Australian Curriculum

Key stages OR Year levels	National Curriculum in England: Physical Education	Australian Curriculum: Health and Physical Education	Australian Curriculum: The Arts - Dance
KS1/ 1-2 KS2/ 3 - 6	<p>Perform dances using simple movement patterns</p> <p>Perform dances using a range of movement patterns</p> <p>Compare their performances (could also apply to dance) with previous ones and demonstrate improvement to achieve their personal best.</p>	<p>Band 1 – 2</p> <p>Sub-strand: Moving our body</p> <p>Perform fundamental movement skills in different movement situations (ACPMP025)</p> <p>Construct and perform imaginative and original movement sequences in response to stimuli (ACPMP026)</p> <p>Create and participate in games (ACPMP027)</p> <p>Band 3 and 4</p> <p>Sub-strand: Moving our body</p> <p>Practise and</p>	<p>Band R – 2</p> <p><i>Strand: Making.</i></p> <p>Explore, improvise and organise ideas to make dance sequences using the elements of dance (ACADAM001).</p> <p>Use fundamental movement skills to develop technical skills when practising dance sequences (ACADAM002).</p> <p>Present dance that communicate ideas to an audience, including dance used by cultural groups in the community (ACADAM003).</p>

Key stages OR Year levels	National Curriculum in England: Physical Education	Australian Curriculum: Health and Physical Education	Australian Curriculum: The Arts - Dance
		<p>refine fundamental movement skills in different movement situations(ACPMP043).</p> <p>Perform movement sequences which link fundamental movement skills(ACPMP044).</p> <p>Practise and apply movement concepts and strategies (ACPMP045).</p> <p>Band 5 and 6</p> <p>Sub-strand: Moving our body</p> <p>Practise specialised movement skills and apply them in different movement situations (ACPMP061).</p> <p>Design and perform a variety of movement sequences (ACPMP062).</p> <p>Propose and apply movement concepts and strategies (ACPMP063).</p>	<p><i>Strand: Responding</i></p> <p>Respond to dance and consider where and why people dance, starting with dances from Australia including dances of Aboriginal and Torres Strait Islander Peoples (ACADAR004)</p>
Attainment targets	By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.	<p>Band 1-2</p> <p>They demonstrate fundamental movement skills in different movement situations and test alternatives to solve movement challenges. They perform movement sequences that incorporate the elements of movement.</p> <p>Band 3 -4</p> <p>They refine fundamental movement skills and movement concepts and strategies in different</p>	<p>By the end of Year 2:</p> <p>students describe the effect of the elements in dance they make, perform and view and where and why people dance.</p> <p>Students use the elements of dance to make and perform dance sequences that demonstrate fundamental movement skills to represent ideas. Students demonstrate safe practice.</p>

Key stages OR Year levels	National Curriculum in England: Physical Education	Australian Curriculum: Health and Physical Education	Australian Curriculum: The Arts - Dance
		<p>physical activities and to solve movement challenges. They create and perform movement sequences using fundamental movement skills and the elements of movement.</p> <p>Band 5-6 They perform specialised movement skills and propose and combine movement concepts and strategies to achieve movement outcomes and <u>solve</u> movement challenges. They <u>apply</u> the elements of movement when composing and creating movement sequences.</p>	<p>By the end of Year 4 students describe and discuss similarities and differences between dances they make, perform and view. They discuss how they and others organise the elements of dance in dances depending upon the purpose.</p> <p>Students structure movements into dance sequences and use the elements of dance and choreographic devices to represent a story or mood. They collaborate to make dances and perform with control, accuracy, projection and focus.</p>
<p>Comparison: Dance is given deserved credence in the Australian Curriculum: The Arts. The rigour and focused aim of developing knowledge, understanding and skills is evident even when comparing the Australian Curriculum: The Arts (Dance) R – 2 with the key stages of NCiE. Here Dance is described in the briefest of terms and does not recognise that dance is more than just a physical activity. The Australian Curriculum: Health and Physical Education demonstrates more rigour within the bands 1-2, 3-4 and 5-6 compared to generalist references in the NCiE.</p>			

- Even more disappointing in the NCiE, is the fact that Drama is only part of the English curriculum. Drama in Education was thriving in England in the late 1970s and 1980s. This paved the way for the establishment of Drama as both a methodology and a subject in its own right. In fact what was happening in England was quite influential in the development of the R – 12 Drama Curriculum Committee, Education Department of South Australia's process, trials, publication and implementation of Images of Life (1981). This publication was quite instrumental in developing a pedagogy that has since influenced many Australian curriculum documents in relation to The Arts from 'Into the 80s' to the South Australian Curriculum Standards and Accountability (SACSA) Framework. In England, teacher training, up until the last 15 years (don't quote me on this) included significant training in Drama as part of the teaching of English where Drama was included for its literacy merits and as a way for students to use spoken language.
- In the NCiE English curriculum there is a revised reference to Drama where it has now been included within the Aims section and in respect to the Spoken language section of the curriculum:

- 'All pupils should be enabled to participate in and gain knowledge, skills and understanding associated with the artistic practice of drama. Pupils should be able to adopt, create and sustain a range of roles, responding appropriately to others in role. They should have opportunities to improvise, devise and script drama for one another and a range of audiences, as well as to rehearse, refine, share and respond thoughtfully to drama and theatre performances.'
- The Spoken language section of the English curriculum is significantly brief as compared to other sections. It is felt very strongly by many Arts organisations in England that there is still not enough Drama within the NCiE curriculum. It certainly lacks the drama structured learning framework and sequence that we have come to know and use as fundamental to the teaching of Drama in Australia for more than 30 years.
- I have come across a document entitled 'Drama in Schools', published by the Arts Council in England. I am unable to ascertain whether this is a recognised curriculum document for schools that offer Drama as a subject. It makes relevant references to the Framework for Teaching English, which is not the same as the NCiE that I was provided.
- This document clearly demonstrates a clear and rigorous framework for the teaching of Drama. Here, the strands of Making, Performing and Responding are reminiscent of drama curriculum prior to the Australian Curriculum: The Arts (Drama), which has since reduced strands to Making and Responding.
- This document, 'Drama in schools' outlines summarised extracts from the Framework for Teaching English in regard to Years 7, 8 and 9:

In Year 7:

Pupils should be taught to:

- *develop drama techniques to explore in role a variety of situations and texts or respond to stimuli*
- *work collaboratively to devise and present scripted and unscripted pieces which maintain the attention of an audience*
- *extend their spoken repertoire by experimenting with language in different role and dramatic contexts*
- *develop drama techniques and strategies for anticipating and visualising and problem-solving in different learning contexts*
- *reflect on and evaluate their own presentations and those of others*

In Year 8:

Pupils should be taught to:

- *reflect on their participation in drama and identify areas for the development of dramatic techniques, eg keep a reflective record of their contribution to dramatic improvisations and presentation*
- *develop the dramatic techniques that enable them to create and maintain a variety of roles*
- *explore and develop ideas, issues and relationships through work in role*
- *collaborate in and evaluate the presentation of dramatic performances, scripted and unscripted, which explore character, relationships and issues.*

In Year 9:

Pupils should be taught to:

- *recognise, evaluate and extend the skills and techniques they have developed through drama*
- *use a range of drama techniques including work in role, to explore issues, ideas and meanings, eg by playing out hypotheses, by changing perspectives*
- *develop and compare different interpretations of scenes or plays by Shakespeare or other dramatists*
- *convey action, character, atmosphere and tension when scripting and performing plays*
- *write critical evaluations of performances they have seen or in which they have participated, identifying the contributions of the writer, director and actor*

In comparison, The Australian Curriculum: The Arts (Drama) is equally rigorous but significantly succinct, user friendly and inclusive on all levels.

The NCiE programme of study and attainment levels for the national curriculum subjects - foundation subjects – for Arts subjects ie Art and Design and Music, are extremely brief (Art and Design – 2 pages and Music – 3 pages). Only a skeleton of content for the subject is available for each key stage.

As a teacher in England, whilst the Purpose of study, Aims and Subject content are quite clear and uses plain English, they are quite brief and I would need further guidance in regard to standard, especially when the Attainment targets are quite generic.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study (Art and Design and Music).

No references were provided regarding these relevant and detailed programmes of study. Further research failed to find anything different to what is already described in the NCiE document.

There does not seem to be the same calibre of academic rigour in the NCiE, especially in respect to the content elaborations of the Australian Curriculum: The Arts.

There is evidence of specific advice regarding challenges in the NCiE. It is inclusive but also states ‘teachers should use appropriate assessment to set targets which are deliberately ambitious’. There seems to be little guidance as to how to achieve this, especially when Attainment targets are generic.

12. Technologies (Foundation to Year 10) – Mr Phil Callil

Executive Summary

This report has been prepared for the Review of the Australian Curriculum in the Technologies learning area for Foundation to Year 10. It examines the curriculum shaping process leading up to the April release of the Technologies Learning area curriculum document that is currently awaiting final endorsement. An analysis of the online survey consultation process for the Draft Australian Curriculum Technologies reveals that:

- the majority of submissions to the online survey came from NSW
- design and technologies secondary education specialists were over represented in these submissions
- primary educators were under represented in both Design and Technologies and Digital Technologies online submissions
- there was high disagreement in a number of specific areas
- there were a number of substantial changes to the document from the consultation period.

While these changes have improved the quality of the document in terms of clarity in layout and tightness of writing, there are some areas that would benefit from further rewriting. These include areas where there was high disagreement initially recorded in content descriptions, pitch and elaborations. The processes that govern the treatment of Design and Technologies and Digital Technologies are remarkably similar yet are still seen as separate. For the sake of clarity, relevance and robustness (especially for Foundation to Year 6 teachers), consideration should be given to seeing these processes as one and the same. Processes in the Technologies learning area are important for rigour because change is often the only constant with advances in technologies that will continue to be rapid, fluid and ongoing. A vision of academic rigour also requires an understanding of the pedagogy of contemporary learning by all teachers across F-12. This highlights the importance of regular, systematic and sequential Professional Learning for teaching in the Technologies learning area.

A number of challenges remain for the teaching of the Technologies learning area in the Foundation to Year 6 area especially. There is a complexity for teachers to address both Design and Technologies and Digital Technologies in a curriculum that is already seen as ‘crowded.’ In the comparison with other countries, no evidence was found that both subjects are studied as separate subjects from Foundation to Year 10. Recommendations include the integration of Design and Technologies into other subjects Foundation to Year 6 and the retention of Digital Technologies from Foundation to Year 10.

The analysis of the Information and communication technology (ICT) general capability in the Australian Curriculum concludes that its treatment of ICT across the curriculum is consistent (and in a number of ways superior) with the coverage and treatment of ICT in other countries such as Finland, Canada, Singapore and the UK. The discussion on ‘Natural Homes’ in the Overview of the General capabilities in the Australian Curriculum identifies a flaw in the logic underpinning the basis for seeing ICT as ‘living’ predominantly in the Technologies learning area. This is important because

it highlights the critical need for curriculum development and changes to assessment in order to leverage the use of ICT in other learning areas to promote effective learning in this day and age.

Similarly, the cross-curriculum priorities framework is consistent with the frameworks in other countries' education systems. Because the Australian Curriculum is so recent, it is highly likely that other countries will refine their approaches based on the Australian Curriculum framework. However, this report finds that the Background and Reference sections to be somewhat dated and should be based on more recent research.

Commendations and Recommendations

The Australian Curriculum, Assessment and Reporting Authority (ACARA) is commended for:

- The openness and transparency of publishing the consultation report online and by identifying strengths, concerns and acting on many of the suggestions received.
- Utilising the use of ICT to set out a curriculum online that is easily cross-referenced. The highlighting of the general capabilities and cross-curriculum priorities through hyperlinks and icons and the use of filtering are powerful.
- The Technologies learning area Scope and Sequence Charts which are clear in structure and meaning¹.
- The structure and content contained in the general capabilities and cross-curriculum priorities frameworks. The content of both is consistent with the content contained in the frameworks in Finland, Canada and Singapore.
- The delineation of an ICT general capability and 'separately defined learning experiences' in computational thinking and other aspects of Computer Science. This is consistent with the findings of a recent Royal Society report into school computer education in the UK.

It is recommended that:

1. The ACARA scope and sequence charts are improved by having the year levels at the top of the second page of the chart.
2. The difference between 'design processes' and 'technologies processes' is further refined e.g. visual representation of relationship between 'design processes', 'technologies process' and 'technologies-specific production processes'. Alternatively, for the sake of clarity and consistency, the processes should be one and the same.
3. Consideration is given for renaming 'Digital Technologies'. It is a name that is not readily identifiable as a commonly known term in the IT industry, Australian tertiary education or education systems in Canada, Finland, Singapore or the UK.
4. While international comparisons are difficult because the curricula in Singapore, Finland and Ontario are years older than the Australian Curriculum and will be revised or released for implementation over the next 12-24 months, the evidence from these countries indicates

¹ Both the Design and Technologies Foundation to Year 10 scope and sequence chart and the Digital Technologies Foundation to Year 10 scope and sequence chart, can be accessed at <http://www.australiancurriculum.edu.au/Download/F10>

that Design and Technologies studies are integrated into other Foundation to Year 6 learning areas. Consideration should be given to the integration of Design and Technologies into other learning areas in the Foundation to Year 6 curriculum and for the commencement of Design and Technologies as separate subjects (either as compulsory or as electives) in lower secondary rather than the primary years.

5. Because the time allotted for Design and Technologies and Digital Technologies is limited in Foundation to Year 6, Digital Technologies remain as an Foundation to Year 10 course and for Design and Technologies to commence in lower secondary. Research into improving the number of graduates going into Information technology (IT) courses at the tertiary level indicate the need to improve pathways for school IT is essential. This is addressed especially well by Ontario where there are electives commencing from Grade 9 that expand into multiple electives in Grade 10-12.
6. If Digital Technologies is to be studied from Foundation to Year 8, the importance of Professional Learning for teachers of Digital Technologies cannot be over estimated. Professional Learning in both Digital Technologies and the ICT capability needs to be ongoing, sequential, systematic and regular.
7. To ensure academic rigour and to better prepare and enhance teacher competencies and expertise for secondary teachers of Digital Technologies, additional training in the understanding of the pedagogy of contemporary learning is undertaken.
8. Elaborations are developed for all Design and Technologies and Digital Technologies content descriptions.
9. Content descriptions and the language used in the preamble for Years 7 and 8 Digital Technologies are simplified and more accessible.
10. The relationship between the Technologies learning area and the ICT general capability is clarified further.
11. There is further direction on the assessment of the ICT general capability across the learning areas
12. The References and Background sections for the ICT general capability are updated to include more recent and relevant research that promotes the use of ICT across the curriculum in meaningful, more contemporary frameworks.

The Curriculum Shaping Process

In April 2014, the Technologies learning area (available for use but waiting final endorsement) describes the final content structure:

'The Australian Curriculum: Technologies Foundation–Year 10 comprises two subjects:

- *Design and Technologies*
- *Digital Technologies*

The Australian Curriculum: Technologies is written on the basis that all students will study the two subjects from Foundation to the end of Year 8.²

² Refer to: <http://www.australiancurriculum.edu.au/technologies/rationale-aims/technologies> (page 5)

In August 2013, the consultation report for the Draft Australian Curriculum: Technologies was released³. Feedback was sought based on the following areas:

- Rationale
- Aims
- Organisation
- Band level descriptions
- Content descriptions
- Content elaborations
- Achievement standards.

ACARA received 352 responses to the online survey: 153 responses for Technologies, 112 responses for Design and Technologies and 87 responses for Digital Technologies. ACARA also received 81 written submissions. Single responses often incorporated the views of many respondents⁴. Table 1 of the Draft Australian Curriculum: Technologies (Foundation to Year 10) Consultation Report outlines the spread of submissions received through the online survey:

Table 1: Online survey respondents by location and category

Background of recipient	Location										Total
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	National	Inter-national	
Professional association	-	12	-	2	1	3	3	-	-	-	21
Education authority	2	2	-	-	1	5	-	-	-	-	10
School leader	-	13	-	1	2	-	-	2	-	-	18
Primary generalist	-	-	-	2	-	-	3	2	-	-	7
Primary specialist	-	-	-	1	-	-	-	-	-	-	1
School	5-	66	-	4	10	8	5	4	-	-	102
Secondary generalist	-	5	-	-	-	-	1	-	-	-	6
Secondary specialist: Design and technologies	1-	81	2	10	10	13	3	1	-	-	121
Secondary specialist: Digital Technologies	2	18	-	4	-	1	2	6	-	-	33
Academic	2	5	-	-	1	-	-	-	-	-	8
Industry/business	-	5	-	-	-	-	3	1	-	-	9
Other	4	5	-	-	3	1	1	2	-	-	16

The majority of submissions clearly came from NSW (over 60 per cent). Even given the quantity of schools in NSW, it suggests that the cross section of the submissions received may not necessarily be

³ Refer to: http://www.acara.edu.au/verve/resources/Draft_Australian_Curriculum_Technologies_-_Consultation_Report_-_August_2013.pdf

⁴ Refer to: http://www.acara.edu.au/verve/resources/Draft_Australian_Curriculum_Technologies_-_Consultation_Report_-_August_2013.pdf (page 9)

representative of Australian education nationally.

Other points of interest:

- Secondary specialists in Design and Technologies made their voice heard in a well organised and systematic way in comparison to their Digital Technologies counterparts (121 submissions from Design and Technologies compared to 33).
- Primary generalist and specialists are under represented (8 from 352 submissions were received).
- School leaders in NSW were much more organised than their counterparts in other states and territories (13 of the 18 submissions received were from NSW).
- School leaders did not take up the opportunity to respond (18 from 352 were from school leaders).

Interpretation:

- Design and Technologies secondary education specialists made up 8 per cent of respondent backgrounds yet accounted for over 60 per cent of the submissions. This group therefore heavily influenced the consultation findings for the online survey.
- The impact of the Australian Curriculum consultation had limited success in reaching stakeholders outside NSW and therefore may not be necessarily representative of Australian education nationally.
- There has been very limited engagement by primary educators.

The 81 written submissions received indicated a wider spread of organisations represented throughout Australia. These included 15 Professional Learning organisations (Design and Technologies, IT, ICT and Home Economics groups), 8 Industry Associations, two business groups (Google Australia and National Instruments), 5 government agencies, 3 Not for Profit organisations, 6 schools (3 from NSW and one from ACT) and 8 universities. A further 22 submissions were received from individuals. ACARA is commended for the openness and transparency of publishing the consultation report online and by identifying strengths, concerns and suggestions received.

Online survey points of interest:

Question		Strongly Agree or Agree	Strongly Disagree or disagree
9	Rationale for the Technologies learning area is clear	92%	
11	Coherence of key components		40%
16	Project management concept is appropriate for learning area	85%	
17	Description of learning in Technologies is pitched appropriately		36%
22	Information and communication technology capability is evident in content.	84%	
31	Ways teachers can implement the Technologies curriculum		49%

Question		Strongly Agree or Agree	Strongly Disagree or disagree
	to support student learning are clear		
32	Ways teachers can implement the Technologies curriculum to support assessment of student learning are clear		44%
35	Content descriptions are manageable in terms of implementation		54%
39	Achievement standards clarity is provided about the depth of teaching and learning required.		42%
43	Glossary definitions are clear	91%	

Design and Technologies survey and written submissions

Points of interest:

1. The low amount of respondents is noted for this national survey:

The Design and Technologies Rationale and Aims	Up to 80
Foundation to Year 2 Curriculum	Up to 44
Year 3 to 4 Curriculum	Up to 24
Year 5 to 6 Curriculum	Up to 25
Year 7 to 8 Curriculum	Up to 71
Year 9 to 10 Curriculum	Up to 60

2. Some items in the Design and Technologies Survey elicited high disagreement:

	Strongly Disagree or disagree F-2	Strongly Disagree or disagree Band 3/4	Strongly Disagree or disagree Band 5/6	Strongly Disagree or disagree Band 7/8	Strongly Disagree or disagree Band 9/10
Draft content descriptions are clear and unambiguous statements of what students should be taught.	34%				30%
Draft content descriptions are pitched appropriately for this band level.	43%	31%	34%	37%	34%
Draft content descriptions describe an appropriate progression across band levels.	42%		38%		31%
Draft content descriptions provide a manageable set for this band level.	39%		42%		33%

	Strongly Disagree or disagree F-2	Strongly Disagree or disagree Band 3/4	Strongly Disagree or disagree Band 5/6	Strongly Disagree or disagree Band 7/8	Strongly Disagree or disagree Band 9/10
The draft content elaborations provide clear and relevant illustrations of the content descriptions.		35%	48%		
The draft achievement standard is pitched appropriately for this band level.		33%	32%	35%	31%
The draft achievement standard describes an appropriate progression of expected learning across band levels.		38%			

3. 'Teachers and schools were very concerned about how they would be able to implement the technologies contexts across Foundation to Year 8' (page 37).
4. 'There were a number of concerns regarding the balance of technologies contexts across Foundation to Year 8. In particular, there was concern over the perceived overlap between food technologies and food and fibre, with some teachers and the NSW Board of Studies responding that food technologies are given too much emphasis in this section' (page 37).
5. 'Further, respondents thought there was too much emphasis on food in the section. The splitting of food content across Health and Physical Education and Technologies was not regarded favourably. Respondents cited the HPE curriculum approach to home economics as a better description of the link' (page 38-9).
6. For Yr 3-4, 'One education authority suggested reviewing the content descriptions in totality, noting that as individual descriptions they are appropriate; however, holistically they appear unnecessarily complex and disconnected' (page 44).
7. 'There were concerns that the language used in the Years 5 to 6 achievement standard is beyond many teachers without a specialist background' (page 45).
8. Conflicting advice from different teacher associations and industry groups was noted. The ACT written submission noted the aspirational nature of some of the content descriptions for Design and Technologies. The NSW submission indicated there was too much emphasis on Food and Fibre Production and Food Technologies and not enough on Digital Technologies. The SA submission suggested strengthened links with Health and PE for food and nutrition.

Digital Technologies survey and written submissions

The low amount of respondents is also noted for this national survey:

The Digital Technologies Rationale and Aims	Up to 67
---	----------

Foundation to Year 2 Curriculum	Up to 40
Year 3 to 4 Curriculum	Up to 29
Year 5 to 6 Curriculum	Up to 27
Year 7 to 8 Curriculum	Up to 50
Year 9 to 10 Curriculum	Up to 51

High disagreement (i.e. Disagree or Strongly Disagree) was noted in the following areas:

1. High agreement was recorded for the Rationale and Aims of Digital Technologies. Some concern was that the rationale does not go far enough in acknowledging how significant a challenge it will be to introduce a digital technologies subject from Foundation in the school environment. (page 61) To this extent, it was recommended by the Australian Council for Computers in Education, National (ACCE) that the 'inclusion of aspirational aims' would reflect a stronger rationale of the importance of Digital Technologies and that there should be more of an emphasis of Digital Technologies in the overarching aims. (page 62)
2. According to submissions from the the Queensland Society for Information Technology in Education (QSITE) and the Information Technology Educators, Australian Capital Territory (in TEACT), the place of multimedia in the curriculum between Media Arts and Digital Technologies needs clarifying.

	F-2	Yr 3-4	Yr 5-6	Yr 7-8	Yr 9-10
The draft content descriptions are clear and unambiguous statements of what students should be taught.	40%				
The draft content descriptions are pitched appropriately for this band level.	50%			53%	
The draft content descriptions describe an appropriate progression across band levels.	48%				
The draft content descriptions provide a manageable set for this band level.	52%	40%		52%	47%
The draft achievement standard is a clear and unambiguous statement of the expected quality of student learning.	38%				
The draft achievement standard is pitched appropriately for this band level.	47%			51%	
The draft achievement standard describes an appropriate progression of expected learning across band levels.	43%			43%	

Changes made from February 2013

In response to the consultation report findings in the Technologies learning area, significant changes were made to the version released in February 2014. The result of these changes has been the acceptance and endorsement of the Technologies learning area by the education authorities in all states and territories. Significant changes are noted in the content descriptions, band descriptions and achievement standards. As noted in the previous section, these were predominantly in areas with high disagreement across the band levels.

Rationale, Aims and Organisation: While content remains essentially the same, there is improvement in layout and tightness in the writing. The rationale justifies the basis for the grouping of Design and Technologies and Digital Technologies as ‘two distinct but related subjects’ (page 4). The last dot point in the Aims section states that these aims for the two subjects ‘extend and complement’ each other.⁵

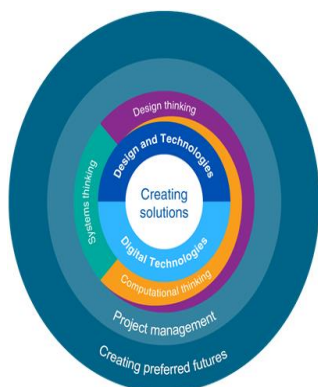


Figure 1 page 5



Figure 2 page 10

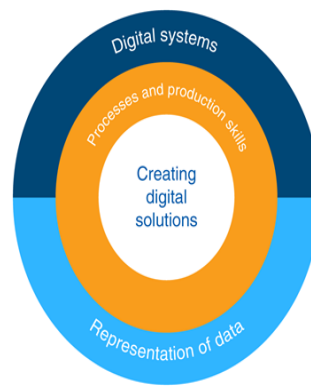


Figure 4 page 14

The inclusion of visuals are an addition to Version 6 and more clearly illustrate key idea relationships in the subjects as well as the relationships between strands and contexts for Technologies. However, the visual representations could have more clearly highlighted the differences between ‘design processes’, ‘technologies processes’ and ‘technologies-specific production processes.’

The ‘Table of Contents’ on page 2 indicates that headings are in place for the Organisation section. While each heading is hyperlinked on Page 2, there are no sub headings in the body of the text. The writing appears somewhat disjointed without sub headings. For example, the Table of Contents indicates that page 31 has a section entitled ‘Implications for teaching, assessment and reporting’. While this content is there, it suffers in a lack of continuity from the preceding paragraphs discussing Economics and Business. The order does not follow logically without sub headings that are indicated (and hyperlinked) in the Table of Contents.

Processes

⁵ Page numbers may relate to a previous version of the curriculum – the current version is Design and Technologies and Digital Technologies, Version 7.1, Dated Monday, 25 August 2014

Design and Technologies processes and production skills
<p>Creating designed solutions by:</p> <ul style="list-style-type: none"> • investigating • generating • producing • evaluating • collaborating and managing

Table 2 page 9

Digital Technologies processes and production skills
<p>Collecting, managing and analysing data</p> <p>Creating digital solutions by:</p> <ul style="list-style-type: none"> • defining • designing • implementing • evaluating • collaborating and managing

Table 3 page 14

As is evidenced by the tables above, the processes for each subject are extremely similar. The ‘Design in the Curriculum’ section of page 32 attempts to explain the difference between the processes for Digital Technologies and Design and Technologies but the paragraphs are identical in the first half of each paragraph. Such nuances are likely to be lost on Primary teachers and perhaps account for the lack of visual detail on processes in the three figures above. For the sake of clarity, having the same process for both subjects should be considered.

Each context is then explained in brevity but with clarity. Each strand is supported and explained in more detail on the proceeding pages. Again, there is clear evidence that the writing has improved in scope from the consultation draft with succinct explanations for all key ideas. This also applies to the explanations for content descriptions, content elaborations, and achievement standards.

The sequencing of the processes and production skills, the content of each area and the implementation of the curriculum have improved between Version 5 and 6. Version 6 begins with the Technologies learning area skills and content and then branches out to an explanation of the key ideas in the Technologies curriculum. From there it provides the contexts for Technologies in implementing the curriculum and progresses to the general capabilities, the cross-curriculum priorities before providing links to other learning areas. This is a noticeable improvement in sequencing from the previous version.

Clarity in Design and Technologies and Digital Technologies

There remains a number of inconsistencies, in terms of definitions, throughout the document. As noted above, the difference between ‘design processes’ and ‘technologies processes’ is unclear and needs greater explanation e.g. visual representation of relationship between ‘design processes’, ‘technologies process’ and ‘technologies-specific production processes’. The difference between the terms ‘Digital Technologies’ and ‘ICT’ has received criticism because the communication of their differences has been difficult. This is because ‘Digital Technologies’ in the Australian Curriculum sense refers to computational thinking and problem solving in a stand alone subject while ‘ICT’ in the Australian Curriculum sense refers to its general capabilities status as opposed to its meaning normally associated in industry. The name of ‘Digital Technologies’ is a name that is not readily identifiable as a commonly known term in the IT industry or tertiary circles. It is a very broad term that is inclusive of much without indicating what it stands for. Consideration should be given to changing it.

The complexity of the four contexts for Design and Technologies and the ten Key concepts behind Digital Technologies being grouped in five separate groups in Digital Technologies also do not lend themselves to clarity at the Primary level especially.⁶

Design and Technologies

Content descriptions, pitch and elaborations

High disagreement was recorded in the online survey for Foundation to Year 2 in draft content descriptions being clear and unambiguous. There has been concern that Foundation to Year 2 is too ambitious given the time allocated to this learning area. Many have been rewritten and content elaborations have increased from 32 in the consultation draft to 41 in Version 6. In Years 9 and 10 where high disagreement was also recorded re content descriptions, content elaborations have been expanded from 33 in the consultation draft to 60 in Version 6.

High disagreement was recorded in the online survey across all band levels for the appropriateness of pitch in the content descriptions. A number of the content elaborations are inappropriate for the year level and this is likely reflected in the high disagreement. For example, in Years 9-10, a number of content elaborations are pitched low. There is also a difficulty in identifying developmental stages in pitch for each band level's content descriptions.

48 per cent of recipients either disagreed or strongly disagreed that the elaborations provided were clear and relevant illustrations in the consultation draft in Year 5 and 6. At this band in Version 6, there are 54 content elaborations but only 23 of the 54 have examples to provide guidance to teachers.

Achievement standards

By design, Foundation to Year 8 achievement standards make reference to 'prescribed technologies contexts'. The scope and sequence chart for F-4 indicates that food and fibre and food specialisations are seen as one. The achievement standards across the year levels make reference to 'products, services and environments' but do not make explicit reference to the four contexts of food and fibre, engineering, food technologies and materials and technologies in the achievement standards. As these contexts inform content descriptions and achievement standards, it would be reasonable to expect that the four contexts would be readily identifiable in the achievement standards.

Digital Technologies

Content descriptions, pitch and elaborations

Most band levels have appropriate content descriptions with realistic elaborations that provide scope and sound achievable examples for each content description. The focus on digital systems and the representation of data is clearly represented by the scope and sequence chart (the scope and sequence chart would be improved by having the year levels at the top of the second page of the chart.) The aim of Digital Technologies is to provide opportunities to move beyond ICT skill

⁶ http://www.acara.edu.au/verve/resources/Technologies_Podcast_transcript_100413.pdf

development. It attempts to move away from a merely IT skills based approach to office applications to a more intellectual challenge. The language used reads at a higher level than perhaps what was intended and is likely to present difficulties to generalist (ie primary sector and junior secondary) teachers.

High disagreement was recorded in the online survey for Foundation to Year 2 especially (questions 108-116) for Digital Technologies. These concerned clarity, pitch, appropriateness, progression and manageability content descriptions and elaborations. While the changes to content descriptions improve the document, a number of the content elaborations remain too high for this band. This in turn affects their appropriateness and manageability. For example, while taking a photograph of a grandparent is relatively straightforward, conducting and recording an interview for a Foundation to Year 2 student may not. Similarly, downloading an image from the web is simple, inserting that image into a document is likely to be a challenge for teachers, let alone their students at this age; manipulating pixel density will present the same challenges to teachers much less students.

Because elaborations that accompany each content description provide the scope and parameters of each description, it is important that they provide direction and support for realistic and achievable tasks at each level.

There are elements of the same difficulty at the Year 7-8 band level that also recorded high disagreement levels for pitch (53 per cent) and manageability (52 per cent) in content descriptions. A number of the elaborations may indicate the aspirational intended nature of the document but do not bear semblance to a realistic enacted Years 7 and 8 Digital Technologies curriculum pitched at the ability level of students at these year levels.

Some examples:

- *‘They design increasingly complex algorithms that allow data to be manipulated automatically, and explore different ways of showing the relationship between data elements to help computation, such as using pivot tables.....’ (page 85). Few teachers would be capable of presenting pivot tables effectively to students at these year levels.*
- *‘Converting between decimal and 8-bit (1byte) unsigned binary, covering whole number typically used for characters and RGB, for example 65 in decimal is 01000001 in 8-bit binary’ (page 86)*
- *‘Querying an existing database to extract data for analysis, for example devising multiple selection criteria or using simple structured query language (SQL) SELECT statements to select records and retrieve specified fields.’ (page 87)*

While these elaborations are admirable intended curriculum elaborations, in all likelihood, most Australian schools do not have classes operating at such a high level in Years 7 and 8. It is unlikely there are many teachers with the required skill set at these year levels. Couple this with the fact that many Australian schools currently do not have separate stand alone IT classes at this band level and these elaborations are better situated at least at the next band level.

Robustness, relevance and scope

The word ‘robustness’ is interpreted as ‘including a foundation in aims, values and principles, academic rigour and relevance.’

The Technologies learning area is written on the assumption that all students from Foundation to Year 8 will study two subjects: Design and Technologies and Digital Technologies. Implementing the curriculum is the responsibility of schools. It is up to schools how they implement the Technologies Learning Area because it largely depends on the direction of the school and the skill set of available teachers. In many schools, the benchmark normally tends to be what the teacher can do. If the Technologies learning area documentation is intended curriculum rather than enacted curriculum, it is aspirational in many parts. While the pitching of content descriptions and supporting elaborations has been set high for Digital Technologies, it does not necessarily follow that this has resulted in ‘robustness’ as defined above if those high expectations in terms of curriculum are not manageable, appropriate and achievable.

The complexity of the four contexts for Design and Technologies and the ten key concepts behind Digital Technologies make it unlikely that any real ‘deep’ knowledge is achievable and sustainable in Foundation to Year 6. The Technologies learning Area structure is admirable and may be achievable, sustainable and robust in Years 7-10 but it is likely that its structure in Foundation to Year 6 will contribute to the ‘mile wide and inch deep’ dimension of the ‘crowded curriculum’. The likely allocation of time to both Design and Technologies and Digital Technologies in the Foundation to Year 6 area (25 minutes each per week - no time allocation is specified in Version 6 anywhere)⁷ is likely to preclude opportunities for any in depth examination if both subjects seek coverage in the primary curriculum. However, states, territories or individual schools could write their own elaborations for content descriptions to demonstrate coverage in an integrated studies approach that is used frequently in Foundation to Year 6 that includes content from the Technologies learning area. This in itself may present problems because the gap between ‘intended’ and ‘enacted’ curriculum could become wider. At the senior secondary level, there are mechanisms and controls (school assessed course work and exams) that ensure that ‘intended’ and ‘enacted’ curriculum remain close. There are no such controls in Foundation to Year 10. It is possible that, depending on the skill level of teachers, the Digital Technologies course may result in it becoming more of a ‘digital literacy’ course rather than one that promotes computational thinking and problem solving. While the Australian Curriculum must be flexible enough to be interpreted by state education authorities, the robustness of the Technologies learning area will depend on the Professional Learning provided to generalist teachers in Foundation to Year 8 especially.

The scope and sequence charts for both Design and Technologies and Digital Technologies are the result of numerous drafts and consultation between the state and territory education authorities. They represent a clear overall summary and show progression and coverage of content descriptions effectively in both Design and Technologies and Digital Technologies subject strands.

Preferred Futures

⁷ Based on Table 1: Indicative Times for writers, page 9, [Curriculum Design Paper Version 3.1](#), ACARA June 2013

The term ‘Preferred Futures’ in Design and Technologies in the scope and sequence chart for Years 7-10 has attracted criticism in some quarters for being values laden and unclear in what is seen or defined as ‘preferred’. The term itself is aspirational and holistic and indicates that regardless of what we see as ‘preferred’, students can contribute in some small way to making the future happen or preventing it happen by the design choices that are made. It may be values laden but the term does not dictate what those values are. Good teaching empowers students to reflect on both the short to long term benefits and limitations of decisions made. That examination of multiple sides of decisions made - constraints of time, ethics, sustainability, financial and economic considerations and implications for society - all contribute to what will be a ‘preferred future.’ It is impossible to examine ethics without values. As students consider preferred futures and become more aware of the positive changes that could be made by their personal actions, this can influence and contribute to the expected (or probable) future. The fundamental task of education today is not just to prepare students for the future, but to equip them to create a future they want to live in⁸. The concept of ‘Preferred Futures’ can therefore be seen as contributing to the robustness and relevance of Design and Technologies at the Years 7-10 level.

Succinct, rigorous and balanced

There is clear evidence in the comparison between the 2013 Consultation Draft and the April 2014 Version 6 of improvement in the succinctness of writing. This is immediately noticeable in changes to the Aims and content descriptions at each band for each subject. The scope and sequence charts for both subjects provide summaries across the strands in a logical and easy to follow format. The diagrams contained in the Organisation section are encapsulations of the key ideas, contexts and relationships between the strands. There is also evidence that many suggestions from state education responses to previous drafts have been consistently listened to and adopted. An example of this was the Queensland suggestion in June 2012 to place further emphasis in the scope and sequence chart on the opportunities for teamwork and collaboration. This has been adopted in the Digital Technologies scope and sequence chart.

The introductory aims for each band were also tightened up in writing style between each version. However, the following excerpt from the Years 7 and 8 band indicates that further improvement could be made in terms of succinctness and clarity.

‘They develop abstractions by identifying common elements while decomposing apparently different problems and systems to define requirements, and recognise that abstractions hide irrelevant details for particular purposes.’ (pg 85, Digital Technologies)

Most teachers (and certainly parents) would struggle to penetrate the meaning behind this sentence at these year levels. As has been noted previously, the concepts aligned to some band levels in Digital Technologies are challenging to teachers and students alike. While the content description language is succinct, the elaborations indicate a complexity that may be difficult to attain at these band levels.

⁸ Eckersley, R. 1999, Dreams and expectations: Young people’s expected and preferred futures and their significance for education. *Futures*, vol. 31, no. 1, pp. 73-90.

Generally however, the Technologies learning area writing is succinct and has benefited by the numerous drafts and extensive consultation process with state education authorities and opportunities for professional associations and practising teachers to contribute.

In regards to rigour, any national curriculum must have a commitment to important knowledge, understanding and skills. Design and Technologies place an emphasis on design thinking, systems thinking, processes and production skills and these are represented clearly both in the document and in the Scope and Sequence chart. Digital Technologies documentation is notable for the absence of naming of any office type applications (e.g. spreadsheets, word processing, presentations). It also deliberately refrains from naming specific new media and in particular social media. In many ways, this future proofs the document from rapid changes in knowledge and skills (content) that characterise the technological world we live in. As new technologies emerge with many going viral, often their demise can be just as quick; any specific technologies recommended today are likely to be outdated in five years or even a year from now. In the Technologies learning area, content is not static. The intention in Digital Technologies is to deepen knowledge and understanding of digital systems and to represent data and to promote computational thinking. As such, the way the document is phrased allows states and schools choices and flexibility in the way they choose to address content descriptions.

The approach in both subjects in the Technologies learning area is to ensure that rigour is incorporated through the processes and production skills followed in each subject. In other words, there is an adherence to rigour in promoting a design process in both subjects that defines and investigates the need for a solution, allows for a design brief that is then produced, evaluated, refined further, project managed and amplified through collaboration. This adherence to process is important in the Technologies learning area because change is the only constant - this fundamentally alters content and requires processes that enable rigour to be applied.

But any definition of rigour requires a commitment and an expertise to knowledge of some sort. Rigour requires that students engage in intellectually challenging tasks that entail discipline⁹. As previously discussed, the concepts aligned with a number of band levels in Digital Technologies in Foundation to Year 8 especially are pitched high. This presents significant challenges for the professional learning requirements of teachers and will require a commitment by each school's leadership team to make provision for these needs. Such professional learning needs will also need to be identified and provided by state education authorities, professional associations and universities. For tertiary providers, this will mean not only providing in-servicing for current teachers but for course modification for pre service teachers.

Such needs are not confined to knowledge specific to technologies. A vision of rigour that leads to academic excellence requires an understanding of the pedagogy of contemporary learning:

- varied teaching methods that provide for direct instruction, independent learning and collaborative learning

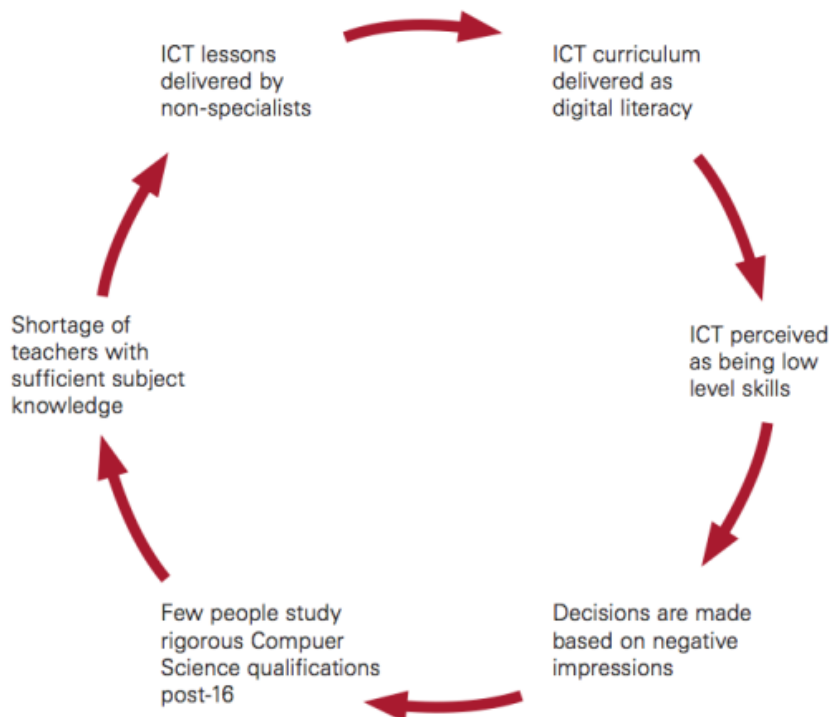
⁹ Bransford, J. D., Brown, A. L., and Cocking, R. R. (Eds.). (2002). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

- assessment methodology
- accountability structures
- the role of creativity and engagement based on a premise of sustained focus
- the use of ICT as a general capability.

In the UK, the quality of IT teaching in schools has been the subject of a number of studies over recent years. A 2012 Royal Society report found that the delivery of Computing Education in many UK schools was highly unsatisfactory¹⁰. This was because of:

1. The current national curriculum in ICT can be very broadly interpreted and may be reduced to the lowest level where non specialist teachers have to deliver it.
2. There is a shortage of teachers who are able to teach beyond basic digital literacy.
3. There is a lack of continuing professional development for teachers of computing.
4. Features of school infrastructure inhibit effective teaching of computing.

This UK report also found that the following cycle was evident in many UK schools:¹¹



Computer science is an area that the UK Government has highlighted as in need of attracting more high quality teachers. It is of interest to note that the Royal Society report also advocates the development of both a cross-curriculum approach to digital literacy and ‘separately defined learning

¹⁰ "Shut down or restart? The way forward for computing in UK schools." *Computing in Schools*. The Royal Society, Accessed 30 May 2014. https://royalsociety.org/~media/Royal_Society_Content/education/policy/computing-in-schools/2012-01-12-Computing-in-Schools.pdf

¹¹ "Shut down or restart? The way forward for computing in UK schools." *Computing in Schools*. The Royal Society, Accessed 30 May 2014. https://royalsociety.org/~media/Royal_Society_Content/education/policy/computing-in-schools/2012-01-12-Computing-in-Schools.pdf

experiences’ in computational thinking and other aspects of Computer science. This is very similar to our general capabilities in ICT and the Digital Technologies course respectively.

In Australia, the situation is similar to the UK in that there is a need to continue to attract more high quality IT teachers. There will clearly also be a need for Professional Learning for existing teachers to meet the challenges of high level content nominated in a number of band levels in Digital Technologies. The Australian Curriculum Technologies learning area is pitched high and has avoided the trap of pitching too low as has seen to be a problem in the UK Computing Education learning area. The recent Building the Education Revolution (BER) and Digital Education Revolution (DER) funding has ensured that the resources and infrastructure in Australian schools are likely to be far superior to their British counterparts.

To ensure academic rigour and to better prepare and enhance teacher competencies and expertise for teachers of Digital Technologies, it is recommended that teachers also undertake additional training in the understanding of the pedagogy of contemporary learning as outlined on the previous page.

General capabilities

Context

In 2010, an Organisation for Economic Co-operation and Development (OECD) Report on technology use and educational performance in PISA 2006 highlighted the importance of ICT in education:

- With the right skills and background, more frequent computer use can lead to better performance.
- ICT familiarity matters for educational performance.
- Identify and foster the development of 21st century skills and competences.
- Adopt holistic policy approaches to ICT in education.
- Promote greater computer use at school and experimental research on its effects.¹²

Six years on from the Melbourne Declaration on Educational Goals for Young Australians (the Melbourne Declaration), it remains debatable how ICT effectiveness has increased in that time in Australian schools. The ICT general capability is the mechanism used in the Australian Curriculum to highlight the role of ICT over the curriculum.

Since 2008, the explosion in the use of mobile devices in education in all first world countries and many third world countries has meant widespread implementation but not necessarily widespread effectiveness. Laptops, tablets, interactive whiteboards and now light-emitting diode (LED) display panels - even faster internet speeds - have a ‘wow’ factor that is ultimately replaced by the ‘so what’ factor if intrinsically interesting things that promote effective learning aren’t done with them. The substantial return on investment (RIO) is considerably reduced. There are multiple reasons for this. These include a lack of vision for the use of ICT by school leaders; pedagogical resistance by teachers

¹² "Are the New Millennium Learners Making the Grade? Technology Use and Educational Performance in PISA 2006." *EDUCERI - OECD*. OECD, 10 Mar. 2010. Accessed 28 April 2014. http://www.keepeek.com/Digital-Asset-Management/oecd/education/are-the-new-millennium-learners-making-the-grade_9789264076044-en#page1

to the use of ICT; lack of subsequent ICT skill development of teachers; other competing priorities. All these contribute to a lack of urgency in evolving the curriculum in many schools. Learning really hasn't fundamentally changed in many classrooms not because of the failure of learning with ICT but because of a lack of commitment to evolving the curriculum to take advantage of new opportunities afforded by the use of technology. It is not about fitting computers into a model of the past, it is about creating a model that will help to frame the future of schools in a much more dynamic way.

General capabilities overview

Page 114 of the Technologies learning area general capabilities section indicates that revision of the ICT capability with the Technologies learning area will continue. Page 115 states that teachers are 'expected to teach and assess general capabilities to the extent that they are incorporated within each learning area.' It is also made clear that state and territory school authorities individually decide on assessment and reporting. This responsibility is then handed to sector authorities for state and territory government, Catholic and for independent schools that are subject to separate regulatory authorities.

'To the extent that they are incorporated within each learning area' allows flexibility but is ultimately self fulfilling in relation to the use of ICT. If school leaders and teachers have limited knowledge of the use of ICT in teaching and learning (ie pedagogy and skills), then ICT is unlikely to be incorporated meaningfully in learning areas.

'In the Australian Curriculum 'capability' encompasses knowledge, skills, behaviours and dispositions.' (page 115).

While this refers to students, it could apply to teachers. If the benchmark is normally what the teacher can do, this often limits the opportunities of the students to demonstrate their understanding using ICT. The need for systematic, regular and on going Professional Learning in ICT is an imperative for teachers. Evidence shows also that increasing professional development opportunities for teachers is an efficient way of boosting ICT use in teaching and learning since it helps build highly confident and positive teachers¹³.

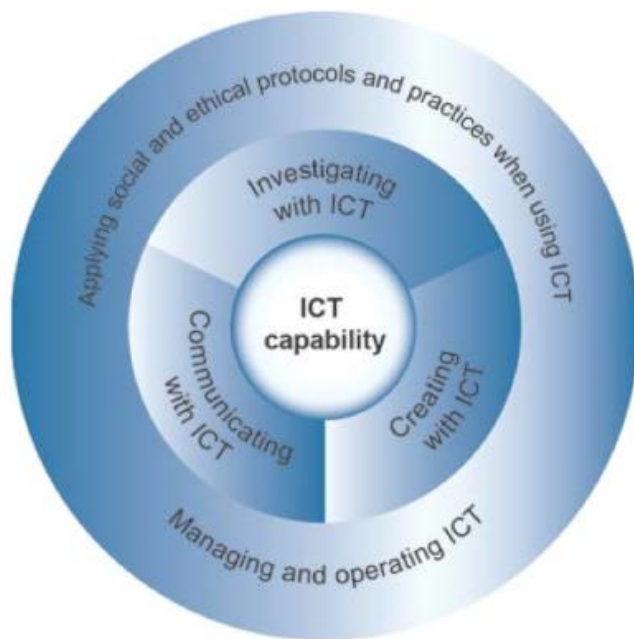
Page 115 also outlines the icons used to identify specific general capabilities. The filter function on the Australian Curriculum website for the Foundation to Year 10 curriculum in mathematics, science, history and English is particularly effective and valuable in searching for individual general capabilities. Content descriptions are identified with a unique code that is hyperlinked and then further identifies the general capabilities associated with the content description.

Organising Elements

The diagram of the ICT capability learning continuum is organised into five interrelated elements.

It is clear and succinct. The inner core of Investigating, Communicating and Creating with ICT is central to the use of ICT as a general capability while the outer core governs their use.

¹³ "Survey of schools: ICT in Education. " *Digital Agenda for Europe*. European Commission, 19 Mar. 2013. Web. 3 June 2014. <http://ec.europa.eu/digital-agenda/en/news/survey-schools-ict-education>



Organising elements for ICT capability

‘Natural Homes’

“Many capabilities find ‘natural homes’ in specific learning areas (for example, Literacy in English, Numeracy in Mathematics, ICT capability in Technologies, Personal and social capability in Health and Physical Education and English, and Intercultural understanding in Languages...while the primary development of Literacy, Numeracy and ICT capability is based in English, Mathematics and Technologies respectively, the development and application of these capabilities across the curriculum is essential to effective teaching and learning” (page 117).

The general capability of ICT and Digital Technologies are not a clean fit as has been advocated above. There needs to be further definition and refinement of their relationship. Digital literacy is only one component of Digital Technologies. As indicated earlier, there is a danger that with the more limited ICT skills of a generalist teacher in primary and junior secondary that may teach the subject, Digital Technologies will become just a digital literacy course in in Foundation to Year 8. The time allotments for English, Maths and Digital Technologies are compared:¹⁴

¹⁴ "Curriculum Design Paper." *Curriculum Design Paper*. Version 3.1. ACARA, 20 June 2013. Accessed 13 May 2014. Page 9 [http://www.acara.edu.au/verve/resources/07_04_Curriculum_Design_Paper_version_3+1_\(June_2012\).pdf](http://www.acara.edu.au/verve/resources/07_04_Curriculum_Design_Paper_version_3+1_(June_2012).pdf)

Learning Area	Subject	Year F	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
English		27%	27%	27%	22%	22%	20%	20%	12%	12%	12%	12%
Mathematics		18%	18%	18%	18%	18%	16%	16%	12%	12%	12%	12%
Technologies	Design and Technologies										4%*	4%*
	Digital Technologies	2%	2%	2%	4%	4%	6%	6%	8%	8%	4%*	4%*

One of the impediments to the more widespread adoption of IT across the curriculum in the 1990s and early 2000s was the reliance on one or two periods of IT in separate, stand alone classes. Skills and dispositions were left in IT classes that were usually in isolation and out of context with mainstream classes. Teachers in other learning areas were able to resist the development of learning outcomes that incorporated the use of ICT because of this. In summary, Literacy ‘lives’ with English but has application throughout the Australian Curriculum. Numeracy ‘lives’ with Maths but has application throughout. Owing to the limited time allotment, ICT should not necessarily be seen to ‘live’ in Technologies but should apply throughout the Australian Curriculum. There is far more time devoted to English and Maths compared to Technologies. The Technologies learning area is divided into two distinct subjects, one of which has four contexts that use technologies but are not necessarily associated with ICT. As such, Technologies is not a ‘natural home’ for the ICT general capability because, as technologies have contributed to the transformation of industries and professions in societies all around the world, ICT should pervade all areas of the Australian Curriculum.

It is accepted that the responsibility for assessment and reporting is a state and territory responsibility. However, there is scope for the general capabilities section in the Technologies learning area to clarify the relationship between the ICT Capability and Digital Technologies and make clearer recommendations for the assessment of ICT as a general capability in all learning areas. Simply put, the development of ICT needs multiple contexts and multiple opportunities that are assessed and reported on to embed good practice in both teaching and learning. While these multiple contexts are provided in the Australian Curriculum learning areas, these contexts need to be assessed and reported against to ensure on going curriculum development.

It is recommended that:

- The relationship between Technologies learning area and the ICT general capability is clarified further
- There is further direction on the assessment of the ICT general capability

Background and References Sections

The Background section cites a number of studies that have contributed to the formulation of the ICT general capabilities philosophy. These range from Papert (1980) and Turkle (1984) up to UK National Strategies published in 2011.

More recent theorists, such as Dede (2009), echo these earlier propositions even as technologies evolve, giving rise to the set of constructs upon which the ICT capability is based. In particular, the overarching element Applying social and ethical protocols and practices when using ICT (sic) addresses the personal, social and cultural contexts introduced by theorists such as Papert and Turkle (page 169).

For most teachers (or parents) reading this, the 'set of constructs' is too abstract for these audiences. The language may be suitable as a construct for the general philosophy that governs Digital Technologies but is just too abstract and too removed from the classroom environment to be of any value to practising teachers. Similarly, the next paragraph on page 169 does not add value and continues in a similarly abstract and fairly non meaningful way:

ICT capability is based on the assumption that technologies are digital tools that enable the student to solve problems and carry out tasks. That is, the ICT system needs to suit the student and the task, while the student needs to develop an understanding of what the machine can do and an appreciation of the limitations under which it operates. In this way, students come to perceive ICT systems as useful tools rather than feeling that they themselves are the tools of the machine (Maas 1983). The latter often occurs when users have little information about how ICT systems operate and simply follow set, standard procedures, determined for them by the system (page 169).

It reads as a dated description that does not position the use of ICT in the second decade of the 21st century. Any reference cited in these sections needs to be identifiable, recognisable and above all useful to current educators in the K-12 space.

In Finland's National Plan for Educational Use of Information and Communications Technology (2010), its first proposal for action on pedagogical models and practices states:

*'It is advisable to adopt activating and participatory working methods and pedagogical practices based on the most recent research.'*¹⁵

It is recommended that

- The References and Background sections are updated to include more recent research that promotes the use of ICT across the curriculum in meaningful frameworks.

Academic rigour and the ICT general capability

While ICT is a way to motivate and engage students in learning activities, engagement does not equal learning. Engagement can lead to learning when the right skills and background create the opportunities for learning to occur. Research clearly demonstrates that student performance changes in response to what educators ask them to do. To develop a student's 21st century skills, educators must develop learning activities that require the use of those skills in critical thinking, problem solving, creativity, innovation, leadership and responsibility.

¹⁵ http://www.edu.fi/download/135308_TVT_opetus kayton_suunnitelma_Eng.pdf (refer to page 13)

Academic rigour in digital learning gets past the hook that engagement that ICT brings. It goes past the idea that learning takes place only in the focus of the few minutes that superficial learning with computers can often bring. As discussed previously, it is important that Digital Technologies teachers undertake additional training in the understanding of the pedagogy of contemporary learning. It is equally important that all teachers across the Australian Curriculum have a vision of academic rigour in digital literacy that moves beyond just skill development in ICT to one in excellence of teaching and learning. This includes an understanding of the following components:

- Creativity is the result of inspired, hard earned achievement and requires structure, discipline and opportunities for reflection.
- Problem solving and collaboration are essential skills to promote.
- Online development through learning management systems and cloud storage of data complement the use of mobile devices to structure the delivery of digital learning.
- Assessment methodology incorporates the use of rubrics supported by checklists to make learning transparent, achievable and challenging.
- Teachers, coordinators departmental heads and school leaders are all accountable for the direction of digital learning.
- Teaching methods include explicit teaching that is learner centred, group work and independent learning that promotes self motivation.
- Creation using digital resources is just as, if not more important than the consumption of digital resources.

Cross-curriculum priorities

The three cross-curriculum priorities in the Australian Curriculum are:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability.

'The cross-curriculum priorities are embedded in the curriculum and will have a strong but varying presence depending on their relevance to each of the learning areas.' (page 27).

In the Technologies learning area, the cross-curriculum priorities for Design and Technologies and Digital Technologies can be found easily on the web site by using the filter and then identifying each priority by its icon. This allows them to be located quickly and efficiently. Content descriptions are also linked to relevant activities in Scootle.

The cross-curriculum priorities in Design and Technologies are located in the elaborations that support content descriptions. They appear to be robust and valuable in providing examples to ensure that content descriptions can be addressed. The cross-curriculum priorities are especially relevant in the Design and Technologies course.

With the exception of perhaps one content description (ACTDIP012), the cross-curriculum priorities are robust and sound in Digital Technologies and can be identified easily in the elaborations that

support each content description.

Appropriateness and necessity

Without being able to comment on other learning areas, the cross-curriculum priorities in the Technologies learning area work well. They are not ‘forced’ to the point where they look tacked on. Sustainability in a world where technology is all pervasive is an especially important and relevant priority because of the need to leverage finite resources and find cheaper, more environmentally friendly solutions that can be easily recycled. Australia retains a unique perspective as a Western country on the doorstep of Asia in a time what is known internationally as the Asian Century. The Americans have their ‘Pivot to Asia’ focus and Australia stands to gain by the increased opportunities presented by the continuation of cheap imports from the region but also the opportunity to leverage the potential of an emerging middle class of Asian consumers eager to engage with Australia. We stand at a considerably more advantageous position if Australia’s workforce of tomorrow has the language skills and a more insightful appreciation of the cultures and traditions of Asia. From a technologies point of view, Asia remains an unquestionably important influence.

Since 1872 when Victoria was the first of the Australian colonies to set up a central public school system based on the principles of free, secular and compulsory education, the treatment of the history of the colonisation of Australia has been enshrined in Australian education as the history told largely from the point of view of the colonisers. Every modern country today holds its indigenous peoples’ histories up to be respected and learnt from. In a truly national curriculum, our treatment of the Aboriginal and Torres Strait Islander histories and cultures should be seen as equally as important as other countries’ histories and cultures. The cross-curriculum priorities are a valuable overlay to ensure balance and relevance across all learning areas in the Australian Curriculum. In the Technologies learning area, they do not appear forced or added and add value.

Comparison with Other High Performing Countries

High performing countries are measured on a broad range of attributes. Both PISA (Programme for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study) measure across a number of educational criteria. The education systems in other countries may be markedly different from that of Australia and thus make comparisons arduous. For example, Finland and Japan are recognised for their high performance in international results across many indicators yet education authorities in both countries have stated ambitions to improve their educational use of ICT because they trail most countries in this area.¹⁶ While Australia’s use of ICT for learning at school and at home is higher than Finland and Japan, Australia trails these countries in many other educational measures.

Similarly, when comparing the treatment of technologies in educational systems in different countries, there are a number of factors that make comparisons difficult. The availability of curriculum documents in some countries may be limited; the terms used (e.g ‘IT’, ‘ICT’, ‘Design and Technologies’, ‘Computing’, ‘Multimedia’) can mean different things in different countries; the

¹⁶ Finland: http://www.edu.fi/download/135308_TVT_opetuskayton_suunnitelma_Eng.pdf

Japan: http://www.itu.int/ITU-D/finance/work-cost-tariffs/events/tariff-seminars/Japan-13/documents/Sess5-2_FutureSchool_Kobayashi.pdf

intended curriculum may well be different than the enacted curriculum. Many countries have designated a discreet subject commencing at different ages and this includes the introduction of more technical computing skills. The following table illustrates the ages in a number of countries for when IT subjects are introduced¹⁷.

Table 1: Ages at which the statutory curriculum first expects skills to be introduced

Country/region	ICT skills (using ICT) Use of software packages, including: word processing, spreadsheets, presentations	Computing skills (ICT technical skills) Introduction of more technical skills, beginning with basic concepts such as using formulae in spreadsheets, understanding what a 'programme' is and suggesting improvements, and, later, adapting and constructing programmes, understanding and/or constructing networks, systems management
Finland [†]	9	14-16
Italy	14	14
Japan	10-12	12
Massachusetts	6	12
Montenegro	11	14
Ontario	6	14
Serbia	7	15
Singapore	12	16

[†] Finland has no national curriculum for ICT; these are the ages at which schools might tend to introduce the skills, through their optional courses.

Singapore

Singapore is a country that is conspicuous for its high results in international educational benchmarking and for embracing the use of technology to make learning more engaging.¹⁸ The Singapore Ministry of Education (MOE) oversees the development of the national curriculum and has a great deal of control over how the curriculum is implemented¹⁹. Over recent years, the MOE has promoted a shift from instruction based on teacher lectures and student memorisation to one that emphasises student engagement and creativity. At the end of primary schooling, students sit for Primary Schooling Leaving Examination (PSLE) to determine their placement in the Express, Normal (Academic) or Normal (Technical) course according to how they perform. In an attempt to make school more student centred at the Primary level, there is a push to reduce the over emphasis on examinations.²⁰

All lower secondary students (ages 12 to 16) have access to a Computer Applications course but it is compulsory for those following the 'Technical' stream to their Graduate Certificate of Education (GCE) 'N' level examinations and is an elective for those following the 'Normal' route. Computer

¹⁷ Sturman, L. and Sizmur, J., (2011). *International Comparison of Computing in Schools*. Slough: NFER.

¹⁸ https://www.youtube.com/watch?v=M_pIK7ghGw4#t=17

¹⁹ <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/singapore-overview/singapore-instructional-systems/>

²⁰ <http://www.moe.gov.sg/education/files/student-centric-values-driven-poster.pdf>

Applications is organised as part of the Mathematics and Sciences Syllabus. Other components of the Sciences syllabus are:

- Mathematics
- Technical Studies
- Design and Technology
- Home Economics

The documentation for the lower secondary subject of Computer Applications looks identical to what is often presented as an elective in Years 9 and 10 in Australian schools as a 'Computer Studies' type class. It is comprehensive in its coverage of topics and while quite 'dry' in content, it covers many of the areas assumed in Australia that students have skills and experience in but often do not. A prominent difference of the 'Computer Applications' between the Australian Curriculum Digital Technologies course is that computational thinking does not appear in the Singapore course documentation. In Singapore, Computer Programming is included for students from 16 years old. It is noted that this MOE document was published in 2007. As stated previously, the aim of Digital Technologies is to provide opportunities to move beyond ICT skill development. It attempts to move away from a merely IT skills based approach to office applications to a more intellectual challenge. The Singaporean Computer Applications course is based on developing basic computer knowledge and skills whereas the Australian Curriculum Digital Technologies also develops abstraction as a generic cognitive skill that supports computational thinking and problem solving.

The Singaporean Design and Technology (D and T) was published in 2006 and is part of a holistic broad-based education²¹. Unlike Computer Applications, it is a compulsory project-based subject in the lower secondary school curriculum. In addition to Design and Technologies being a compulsory subject, Home Economics is also a compulsory subject. D and T anchors on design action and the application of knowledge and process skills.

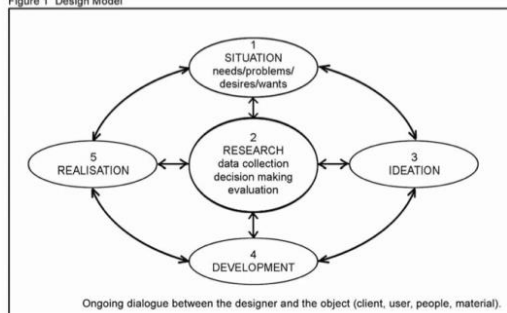
Table 1 Summary of Topics

Design Appreciation	Designing	Making
1 Aesthetics 2 Design in Society 3 Sustainability 4 Basic Technology	5 Design Method 6 Need Definition 7 Research 8 Idea Generation and Development 9 Communication 10 Evaluation	11 Planning 12 Materials 13 Practical Processes

²¹ Design and Technology Syllabus Lower Secondary Special/Express/Normal (Academic) Ministry of Education Singapore 2006, refer to: <http://www.moe.gov.sg/education/syllabuses/sciences/>

The topics above are more conceptual and contrast with the four contexts for Design and Technologies in the Australian Curriculum. The Singaporean Design Model is very similar to the processes used in the Australian Design and Technologies:

Figure 1 Design Model



Note: The numbering of the design stages is meant as a guide.

Design and Technologies processes and production skills

Creating designed solutions by:

- investigating
- generating
- producing
- evaluating
- collaborating and managing

The assessment Design and Technologies at the lower secondary level in Singapore includes an examination worth 20 per cent.

Home Economics in Singapore

In Singapore, Home Economics comprises of a Food and Consumer Education Syllabus due for implementation in 2014.²² It commences in Years 7 and 8. Home Economics is not a stand-alone subject in the Primary levels. In lower secondary, the Food Studies Core has Diet and Health (Meal Planning and Diet Related Diseases) and Food Management (Methods of Cooking, Food and Kitchen Safety, Culinary Skills and Food and Culture) as two broad topics. Consumer Studies has Resource Management (Money Management and Financial Literacy) and Consumer Awareness (rights and responsibilities) as its two broad topics. There are three electives to choose from:

CORE AREAS OF STUDY	ELECTIVE MODULES (Choose <u>1 EM</u> only)
1. Food Studies	3A. Nutrition & Food Science
	3B. Food Entrepreneurship
2. Consumer Studies	3C. FCE & the Community

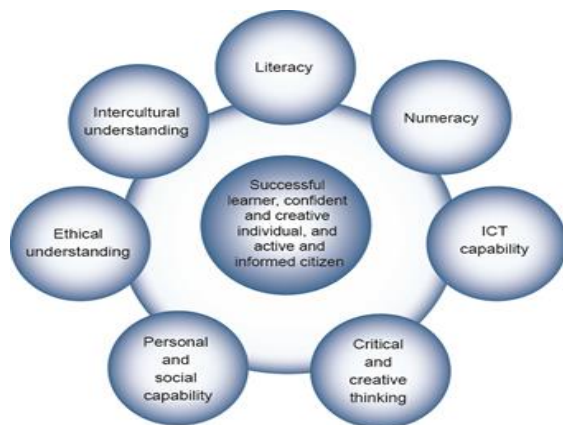
Comparison with the Australian Curriculum

The Singaporean model represents a very different emphasis in comparison to the food technologies in Design and Technologies in the Australian Curriculum. The Singaporean model operates on a more personal level of empowering the student to be a functioning member of society by a focus on

²² Ministry of Education, Food And Consumer Education Syllabus Lower Secondary 2014 Singapore 2014 page 5, refer to: <http://www.moe.gov.sg/education/syllabuses/sciences/>

practical skills in meal preparation and as a consumer and entrepreneur with basic financial literacy skills. Historically, Asian countries such as Singapore and Japan have always had a very different focus to Western countries in the focus on health and nutrition for the individual. Food technologies in the Australian Curriculum operate on a more macro systems level. The Australian Curriculum content in food technologies also reflects Australia's position as a primary agricultural producer.

The recently released Framework for 21st Century Competencies and Student Outcomes in Singapore has many similarities with the Australian Curriculum general capabilities.²³



Australia



Singapore

The outer ring of:

- Civic Literacy, Global Awareness and Cross-Cultural Skills
- Critical and Inventive Thinking
- Communication, Collaboration and Information Skills

represents the emerging 21st Century Competencies deemed necessary by the Singapore Ministry of Education to function in a 'globalised world'.

Finland

Finland is currently developing their own framework for future skills and competences. Whereas the Australian Curriculum has the general capabilities and Singapore has the Framework for 21st Century Competencies, the equivalent Finnish response is the development of what is termed 'Future Citizenship Skills'. ICT is identifiable in 'Working and Interaction Skills'²⁴:

²³ Refer to the 21st Century Competencies diagram on <http://www.moe.gov.sg/education/21cc/>

²⁴ "Appendix 2: Future citizenship skills." *National Plan for Educational Use of Information and Communications Technology*. Ministry of Transport and Communications, 1 Dec. 2010. Accessed 30 May 2014. http://www.edu.fi/download/135308_TVT_opetuskayton_suunnitelma_Eng.pdf

Thinking skills

- Problem-solving, reasoning, argumentation and drawing conclusions
- Critical, analytical and systemic thinking
- Creative and innovative thinking

Working and interaction skills

- Skills in acquisition, processing and use of information
- Communication, co-operation and negotiation skills
- Independent and persistent working skills
- Time management and flexibility
- Entrepreneurship and change management
- Skills in use of ICT and other technologies
- Study skills

Manual and expression skills

- Body co-ordination
- Diverse expression and performance skills and confidence
- Planning and production skills
- Inventiveness, experimentation and use of imagination

Participation and influencing skills

- Understanding the community and society
- Sense of initiative and management skills
- Ability to act constructively
- Acceptance of diversity and different opinions
- Media skills
- Skills in thinking ahead and constructing the future

Self-knowledge and responsibility skills

- Self-knowledge and reflection
- Attendance to health and safety
- Ethics, responsibility and functioning as a member of the community
- Good manners and empathy.

It can be seen that the Australian Curriculum concept of the general capabilities, Singapore's 21st Century Competencies and Finland's Future Citizenship Skills are all designed frameworks that are similar in the promotion and encouragement of skills and competencies identified as being important to implement across the curriculum. The summary of the equivalent treatment of the ICT Capability in Canada also reveals a similar framework for cross-curricula components.

Cross-curriculum priorities in Finland

Like the Australian Curriculum's cross-curriculum priorities (Aboriginal and Torres Straits Islanders histories and cultures, Asia and Australia's engagement with Asia and sustainability), the Finnish National Board of Education nominates a number of themes for integration across the curriculum:

- Growth as a person
- Cultural identity and internationalism
- Media skills and communication
- Participatory citizenship and entrepreneurship
- Responsibility for the environment, well being and a sustainable future
- Safety and traffic
- Technology and the individual

While ICT is not given recognition as a stand alone subject in the Finnish curriculum, it again is identifiable above in 'communication' and 'technology'. It figures alongside recognisable components that appear in both the Australian Curriculum cross-curriculum priorities and the Finnish themes for integration. 'Cultural identity and internationalism' equate with 'Aboriginal and Torres Straits Islanders histories and cultures' and 'Asia and Australia's engagement with Asia' and 'Responsibility for the environment, well being and a sustainable future' is identifiable with 'sustainability' in the Australian Curriculum.

Each of the Finnish cross-curricular themes are included in the core and optional subjects and 'are to be manifest in the school's operational culture'.²⁵ Each is prefaced with an overview followed by objectives and core contents.

ICT in the Finnish Curriculum

The Finnish National Board of Education determines the National Core Curriculum. The present National Core Curriculum for basic education was introduced in schools in August 2006. The Finnish National Board of Education is preparing a renewed core curriculum for basic and pre-primary education to be completed by the end of 2014 with new local curricula based on this core curriculum to be implemented by the beginning of school year 2016–2017.

As noted earlier, Finland does not specify particular ICT skills or knowledge as the national core curriculum allows flexibility for each municipality and school to design its own curriculum for optional studies in ICT. Courses are discretionary and localised but still must follow the basic education framework. The national curriculum consists of guiding principles and there is an implied trust that local communities are able to interpret goals and create their own curricula. The renewed core curriculum also does not allow for ICT as a stand-alone subject which means that ICT studies will remain an optional study in the local curricula defined by each school.

The desire to change the use of ICT in Finnish education to meet the challenges of the next decade is acknowledged by the National Plan for Educational Use of Information and Communications Technology, 2010.

*'Finland has been at the top of international comparative assessments of learning outcomes for almost ten years now. The factors that have led to this success are not the same ones that will keep us at the top for the next ten years. In order for Finland to retain its position as a top country in education, schools need to make diverse use of the opportunities provided by ICT and media.'*²⁶

Rather than provide for a separate stand alone IT subject, the preference in Finland is to enable individual municipalities and schools to make decisions on the integration of ICT in the development of curriculum. While there is no national curriculum for ICT in Finnish schools, the optional courses are sanctioned by the government (subjects connected with information technology) and are reportedly popular and range from basic Computing skills to programming.²⁷

Home Economics in Finland

In Finland, Home Economics is a compulsory school subject for all pupils in the 7th grade of basic education. As an optional subject, it is offered in 8th and 9th grades. Home Economics education includes both theory and practice - for example, students learn the basic skills of cooking. Core contents are:

²⁵ "7 Learning objectives and core elements of education." *Basic Education*. Finnish National Board of Education, Page 2. Accessed 30 May 2014 http://www.oph.fi/download/47675_POPS_net_new_2.pdf

²⁶ *National Plan for Educational Use of Information and Communications Technology*. Ministry of Transport and Communications, 1 Dec. 2010. Accessed 30 May 2014. Page 6.

http://www.edu.fi/download/135308_TVT_opetuskayton_suunnitelma_Eng.pdf

²⁷ Sturman, L. and Sizmur, J., (2011). *International Comparison of Computing in Schools*. Slough: NFER.

- Family and living together
- Nutrition and the culture of food
- The consumer and a changing society
- Home and environment

The objectives of the course are essentially a focus on good citizenship and being a responsible consumer. It is clear that both of these objectives are based on the family unit²⁸:

OBJECTIVES

The pupils will

- come to understand the importance of good manners and equality from the standpoint of the well-being of the individual and family
- learn to think about everyday household management and its connections with their own choices and activities
- learn to perform basic tasks related to the care of textiles, a residence, and a household, and to use substances, tools, and working approaches that are appropriate, safe, and compatible with sustainable development
- learn to act as considerate, responsible consumers, and to be aware of problems related to consumption
- become aware of the national domestic culture, and of the possibilities ushered in by internationalization and multiculturalism.

The core contents ‘Family and living together’ reinforce the importance of family and equality in Finland:

CORE CONTENTS

Family and living together

- good manners, the culture of manners, and domestic celebrations
- social responsibility and an atmosphere of caring
- equality and the use of time in the family

Ontario Province, Canada

Canada has no national curriculum with education being a responsibility of each of the ten provinces. Each province acts autonomously on an educational level. Ontario’s public education has a reputation for being the premier province in Canada. It is acknowledged for its culture of high expectations and as one of the most equitable education systems in the world.

Design and Technologies in Ontario

In Ontario, the name for the equivalent Design and Technologies in Australia is called ‘Technological Education’ in Canada. This course documentation was last updated in 2009. It should be noted that the Ontario treatment of Technological Education is very different from other Canadian provinces. For example, British Columbia has a Year 8 Applied Skills elective program that covers many of the Design and Technologies components for the commencement of their secondary program. The Ontario curriculum is divided into Elementary (Grades 1-8) and Secondary (Grades 9-12).

²⁸ http://www.oph.fi/download/47671_core_curricula_basic_education_1.pdf (refer to page 250)

Ontario Technological Education is seen as a 'broad based' approach - students learn best by doing²⁹. It groups related occupations and industry sectors within particular subject areas as a way of workplace preparation for related occupations. Roles and responsibilities of students, parents, teachers and Principals are clearly spelled out in a separate section. Community partnerships are encouraged and are seen as an important source for schools and students.

Years 9-12 Technologies Education

The Technologies Education curriculum in Grades 9–12 are electives and encompass ten subject areas:

Communications Technology	Green Industries	Technological Design
Computer Technology	Hairstyling and Aesthetics	Hospitality and Tourism
Construction Technology	Health Care	Manufacturing Technology
Transportation Technology ³⁰		

They are 'open' courses and are not designed with the specific requirements of universities, colleges, or the workplace in mind. Each subject area has a 9-12 pathway with the Grade 9 courses as introductory courses to the above. The fundamental technological concepts that inform the Ontario study of design and technologies are:

Aesthetics	Control	Environmental sustainability	Ergonomics
Fabrication/ building/creation	Innovation	Material	Mechanism
Power and energy	Safety	Structure	Systems

The four strands for Technologies Education in Ontario are:

- Fundamentals
- Skills
- Technology, the Environment and Society
- Professional Practice and Career Opportunities.

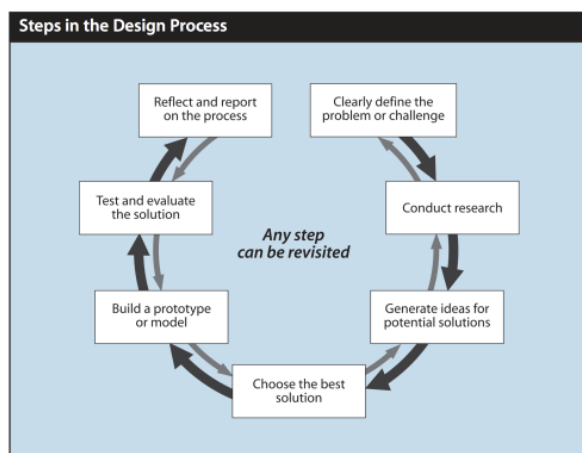
²⁹ "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government. (Pg 6) Accessed 2 June 2014.

³⁰ "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government, Accessed 2 June 2014. <http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

Problem solving methods and approaches are identified:

Parts substitution	Reverse Engineering	Extreme Cases
Diagnostics	Divide and Conquer	Trial and Error

These are in addition to the design process that can be applied to many technological fields. This is almost identical to the design process used in both Australia and Singapore³¹.



The role of ICT is identified in its own section and its use is encouraged to support learning and communicate it (i.e. equivalent of ICT general capability)

Environmental education is also seen as central to the teaching and learning of Technological Education:

*Environmental education 'is the responsibility of the entire education community. It is a content area and can be taught. It is an approach to critical thinking, citizenship, and personal responsibility, and can be modelled. It is a context that can enrich and enliven education in all subject areas and offer students the opportunity to develop a deeper connection with themselves, their role in society, and their interdependence on one another and the Earth's natural systems'.*³²

A comprehensive Environmental Education 220 page scope and sequence of expectations document³³ was released in 2011. The document covers how Environmental Education should be addressed in all core subjects. A similar document based on year levels is applicable to Grades 1-8 in the Ontario Elementary Curriculum.

The roles of literacy, numeracy as well as inquiry/research skills are specifically discussed. There is no diagrammatic representation of the themes evident in the course documentation but literacy,

³¹ "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government, Accessed 2 June 2014. <http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

³² "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government, Accessed 2 June 2014. Page 38 <http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

³³ <http://www.edu.gov.on.ca/eng/curriculum/secondary/environment.html>

numeracy as well as inquiry/research skills appear in a similar way in other subject documentation as the general capabilities appear in the Australian Curriculum.

The Ontario Skills Passport (OSP)³⁴ is a bilingual web-based resource that enhances the relevance of classroom learning for students and strengthens school–work connections.

*The OSP provides clear descriptions of Essential Skills such as Reading Text, Writing, Computer Use, Measurement and Calculation, and Problem Solving and includes an extensive database of occupation-specific workplace tasks that illustrate how workers use these skills on the job. The OSP also includes descriptions of important work habits, such as working safely, being reliable, and providing excellent customer service.*³⁵

Family Studies in Ontario

An extensive investigation was conducted to try to find evidence of Home Economics or Food Studies. Often these subjects cover food specialisations and food and fibre production that comprise part of the contexts in the Australian Design and Technologies. Other aspects are often covered in Health and PE.

Eventually the subject of Family Studies was tracked down in the Social Sciences and Humanities curriculum. Family Studies has a number of electives that appear in Years 9-12³⁶.

Grade 9	Grade 10	Grade 11	Grade 12
<i>Food and Nutrition</i>			
Exploring Family Studies (HIF1O)	OR Exploring Family Studies (HIF2O)	Food and Culture (HFC3M)	Nutrition and Health (HFA4U)**
Food and Nutrition (HFN1O)	OR Food and Nutrition (HFN2O)	Food and Culture (HFC3E)	Nutrition and Health (HFA4C)***
			Food and Healthy Living (HFL4E)

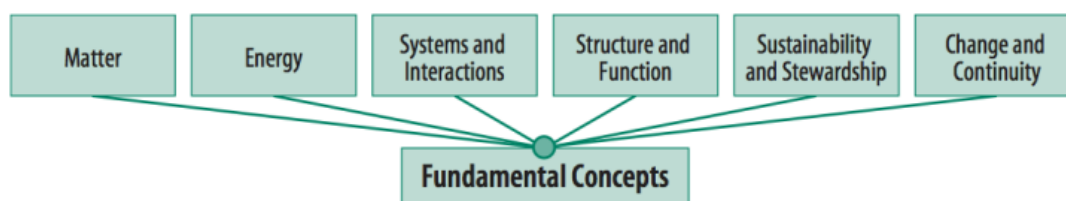
In the Ontario Elementary Curriculum Grades 1-8, Science and Technology and Health and PE cover the Ontario equivalent of Design and Technologies in these year levels. No evidence of Family Studies or Home Economics was identified in the Social Studies Elementary Curriculum. Science and Technology in Grades 1-8 covers the following areas³⁷:

³⁴ <http://www.skills.edu.gov.on.ca/OSP2Web/EDU/DisplayEssentialSkills.xhtml>

³⁵ "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government, Accessed 2 June 2014. Page 30 <http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

³⁶ "The Ontario Curriculum Grades 9 to 12 Social Sciences and Humanities." *Ontario Ministry of Education*. Ontario Government, Accessed 7 June 2014. Page 17

³⁷ "The Ontario Curriculum Grades 1 to 8 Science and Technology." *Ontario Ministry of Education*. Ontario Government, Accessed 8 June 2014. Page 6. Refer to <http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18currb.pdf>



Computer Studies in Ontario

In Ontario, there is no separate stand-alone subject for ICT/Digital Literacy/Computer Studies in the Elementary Curriculum. ICT appears as a general capability (to use the Australian term) in all areas of the Elementary Curriculum and, alongside Literacy, Numeracy, Inquiry, Critical Thinking and Critical Literacy and Environmental Education, ICT is expected to be incorporated into teaching and learning. Science and Technology is where Technology is covered in the Elementary curriculum.

In the Secondary Curriculum, students have access to a comprehensive range of specialist technical courses in Technological Education and Computer Studies from Grade 9 (age 14). These are electives. 'Exploring Computer Technology' is the only subject offered in Grade 9 and this appears as an elective in Technological Education. It is described in course documentation as allowing students to 'further explore and develop technological knowledge and skills introduced in the elementary science and technology program.'³⁸

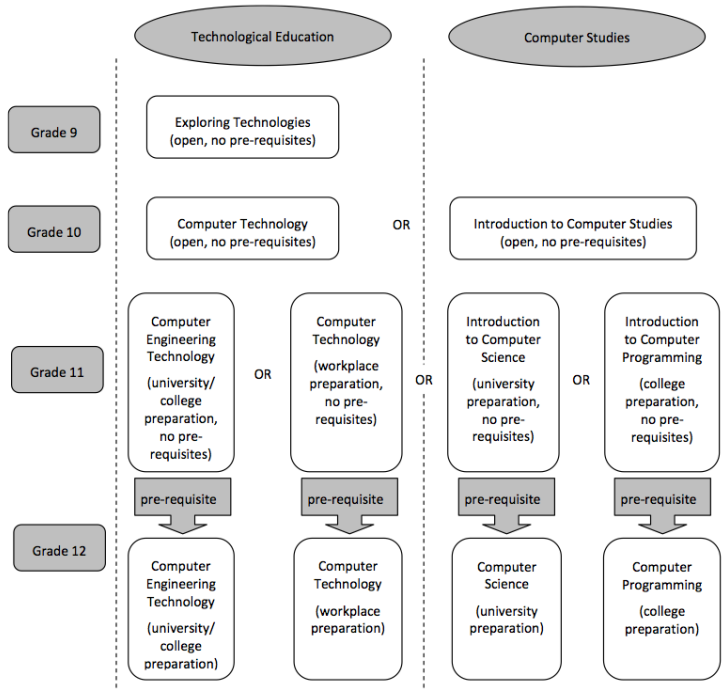
From Years 10-12, there is an impressive menu of computing courses offered in the Ontario curriculum. Some of these courses develop broad transferable skills while others provide a sound foundation in software development and programming³⁹. From the Elementary Curriculum Science and Technology curriculum to the range of options available from Grade 10 to Grade 12, a pathway for Computer Studies to tertiary education has been created⁴⁰:

³⁸ "The Ontario Curriculum Grades 9 and 10 Technological Education." *Ontario Ministry of Education*. Ontario Government, Accessed 7 June 2014. Page 43 <http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

³⁹ Sturman, L. and Sizmur, J., (2011). *International Comparison of Computing in Schools*. Slough: NFER. Page 10

⁴⁰ Sturman, L. and Sizmur, J., (2011). *International Comparison of Computing in Schools*. Slough: NFER. Page 14

Diagram 1: Summary of the options available in the Ontario model



Bibliography

Bransford, J. D., Brown, A. L., and Cocking, R. R. (Eds.). (2002). How people learn: Brain, mind, experience, and school. Washington, DC: National Academy Press.

Curriculum Design Paper. Version 3.1. ACARA, 10 June 2013. Accessed 7-13 May 2014.
[http://www.acara.edu.au/verve/resources/07_04_Curriculum_Design_Paper_version_3+1_\(June_2012\).pdf](http://www.acara.edu.au/verve/resources/07_04_Curriculum_Design_Paper_version_3+1_(June_2012).pdf)

Design and Technology Syllabus Lower Secondary Special/Express/Normal (Academic) Ministry of Education Singapore 2006
<http://www.moe.gov.sg/education/syllabuses/sciences/files/design-and-technology-lower-secondary-2007.pdf>

Donnelly, Kevin. Why our schools are failing. Potts Point, NSW, Duffy and Snellgrove, 2004.

Draft Australian Curriculum: Technologies. Consultation Report. ACARA. Accessed 30 Apr. 2014.
http://www.acara.edu.au/verve/resources/Draft_Australian_Curriculum_Technologies_-_Consultation_Report_-_August_2013.pdf

Eckersley, R. 1999, Dreams and expectations: Young people's expected and preferred futures and their significance for education. Futures, Vol. 31, no. 1, pp. 73-90.

Food and Consumer Education Syllabus Lower Secondary 2014 Ministry of Education Singapore 2014

Sturman, L. and Sizmur, J., International Comparison of Computing in Schools. Slough: NFER. 2011

Technologies (Available for use; awaiting final endorsement). The Australian Curriculum v6.0. ACARA, 18 Feb. 2014. Accessed 6 May 2014. <http://www.australiancurriculum.edu.au/technologies/rationale-aims/technologies>

Transcript: Technologies webcast presented to participants of the Intensive Engagement Activity – March 14, 2013. ACARA, 14 Mar. 2013. Accessed 7 May 2014.
http://www.acara.edu.au/verve/resources/Technologies_Podcast_transcript_100413.pdf

Are the New Millennium Learners Making the Grade? Technology Use and Educational Performance in PISA 2006. EDUCERI - OECD. 10 Mar. 2010. Accessed 28 April 2014. http://www.keepeek.com/Digital-Asset-Management/oecd/education/are-the-new-millennium-learners-making-the-grade_9789264076044-en#page1

Survey of schools: ICT in Education. Digital Agenda for Europe. European Commission, 19 Mar. 2013. Accessed 3 June 2014. <http://ec.europa.eu/digital-agenda/en/news/survey-schools-ict-education>

7 Learning objectives and core elements of education. Basic Education. Finnish National Board of Education. Accessed 30 May 2014.
http://www.oph.fi/download/47675_POPS_net_new_2.pdf

National Core Curriculum for Basic Education 2004. Finnish National Board of Education. Accessed 30 May 2014.
http://www.oph.fi/download/47671_core_curricula_basic_education_1.pdf

National Plan for Educational Use of Information and Communications Technology. Ministry of Communications, Finland. 1 Dec. 2010. Accessed 13 May 2014.
http://www.edu.fi/download/135308_TVT_opetuskayton_suunnitelma_Eng.pdf

Food and Consumer Education Syllabus Lower Secondary 2014 Ministry of Education Singapore 2014

<http://www.moe.gov.sg/education/syllabuses/sciences/files/food-consumer-education.pdf>

Student Centric and Values Driven. Holistic Education. Ministry of Education, Singapore. Accessed 17 May 2014.

<http://www.moe.gov.sg/education/files/student-centric-values-driven-poster.pdf>

Future School Promotion Project. Ministry of Internal Affairs and Communications (MIC), JAPAN, 13 Apr. 2013. Accessed 15 May 2014.

http://www.itu.int/ITU-D/finance/work-cost-tariffs/events/tariff-seminars/Japan-13/documents/Sess5-2_FutureSchool_Kobayashi.pdf

NCEE: Singapore: Instructional Systems. Accessed 16 May 2014. <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/singapore-overview/singapore-instructional-systems>

The Ontario Curriculum Grades 9 and 10 Technological Education. Ontario Ministry of Education. Ontario Government. Accessed 2 June 2014.

<http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

Environmental Education, 2011 Edition. Ontario Ministry of Education. Ontario Government, 2011. Accessed 2 June 2014. <http://www.edu.gov.on.ca/eng/curriculum/secondary/environment.html>

Essential Skills (ES). Ontario Skills Passport. Ontario Ministry of Education. Ontario Government Accessed 2 June 2014. <http://www.skills.edu.gov.on.ca/OSP2Web/EDU/DisplayEssentialSkills.xhtml>

The Ontario Curriculum Grades 9 and 10 Technological Education. Ontario Ministry of Education. Ontario Government. Accessed 2 June 2014.

<http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf>

The Ontario Curriculum Grades 9 to 12 Social Sciences and Humanities. Ontario Ministry of Education. Ontario Government. Accessed 2 June 2014.

<http://www.edu.gov.on.ca/eng/curriculum/secondary/ssciences9to122013.pdf>

The Ontario Curriculum Grades 1 to 8 Science and Technology. Ontario Ministry of Education. Ontario Government. Accessed 8 June 2014.

<http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18currb.pdf>

Shut down or restart? The way forward for computing in UK schools. Computing in Schools. The Royal Society, Accessed 30 May 2014.

https://royalsociety.org/~media/Royal_Society_Content/education/policy/computing-in-schools/2012-01-12-Computing-in-Schools.pdf

Singapore's 21st Century Teaching Strategies (Education Everywhere Series). YouTube, Accessed 16 May 2014.

https://www.youtube.com/watch?v=M_pIK7ghGw4#t=17

13. Civics and Citizenship (Year 3 to Year 10) – Professor Anne Twomey¹

Executive Summary

While the proposed Australian Curriculum: Civics and Citizenship is thoughtful and well-structured, it could still do with further consideration. This report raises a number of concerns about it. First, while the structure is clear and simple, it is also arbitrary in that it requires teachers to jump from topic to topic without any thematic links between them. Further, the balance and sequencing appears to be inappropriate. To the extent that the citizenship strand deals with ideological issues concerning the formation of identity, respect for others, shared values and belonging, it would be more usefully included in the formative primary years, while in the secondary years, it would be more appropriate to teach the elements of the curriculum that require analytical thought and greater technical understanding of the system of government. For example, Year 5 in primary school does not appear to be the best time to be teaching about the democratic ideas behind preferential and proportional representation. It would be preferable to focus more deeply on elections and referenda in late secondary school (for example, in Year 10) when students are beginning to contemplate the prospect of exercising their own vote.

There are also significant gaps in the curriculum, with the consequence that no one who had been taught it could graduate with a clear understanding of the system of government. This is because it leaves out virtually all discussion of the executive (such as the Prime Minister, the Cabinet, policy formation and the public service) as well as public finance (the budget, funding of programs, taxes and grants to the states/territories). It would also be beneficial to explain more clearly to students the hierarchy of laws and to discuss the role of accountability agencies. Consideration should also be given to the extent to which the history of democratic institutions and struggles is addressed. Some use of the cross-curriculum priorities is highly relevant, such as discussion of Indigenous matters, but some appears to be very strained.

Comparison with curricula in other jurisdictions shows that they have a greater emphasis not only on the role of the executive, but particularly upon the economic and financial aspects of government. They also seem to present a more sophisticated assessment of rights and freedoms, including conflicts between rights and how they are resolved.

Parts 1 and 2 of this report deal with the framework, structure, content and sequencing of the proposed curriculum. Part 3 provides specific comments on aspects of the curriculum in each year to aid the making of minor revisions to the proposed curriculum. Part 4 discusses comparative curricula in England, Finland and South Korea. Part 5 provides a brief conclusion. Appendix A discusses the definitions in the Glossary and Appendix B provides an alternative structure if a major revision is to take place.

¹ Professor of Constitutional Law, University of Sydney. The views expressed are those of the author alone and do not represent the views of Sydney Law School or the University of Sydney.

Introduction

This report is directed at the content of the proposed Australian Curriculum: Civics and Citizenship documentation, rather than the methods by which it is taught. It addresses matters including the proposed curriculum's academic rigour, structure and sequencing, clarity, balance and its comprehensive inclusion of key concepts and information. It also considers how accessible and comprehensible the curriculum documentation is to others, including parents, and the need for further guidance, especially to new teachers. In its approach, this report takes into account the need for flexibility and to avoid an overly prescriptive or excessively detailed document, while balancing this against the need for clarity of content.

Part 1 of this report deals with the framework and structure of the proposed curriculum. Part 2 addresses its content and sequencing. Part 3 provides specific comments on aspects of the curriculum in each year. Part 4 discusses comparative curricula in England, Finland and South Korea. Part 5 provides a brief conclusion. Appendix A discusses the Glossary and proposes some changes to definitions to improve accuracy and clarity. It also suggests the inclusion of some additional terms. Appendix B suggests an alternative structure for consideration if a more substantial revision of the curriculum were to be undertaken.

The Australian Curriculum: Civics and Citizenship runs from Years 3 to 10. It is divided into two strands. The first strand is the 'civics and citizenship knowledge and understanding' strand. This contains the content that is to be taught. It is this strand upon which this report concentrates. The second strand is the 'civics and citizenship skills' strand. It develops skills such as analysis and interpretation, research, problem-solving, decision-making and communication. In doing so, it operates by reference to the content in the first strand. Accordingly, the skills strand is not directly addressed in this report, but if any changes are made to the knowledge and understanding strand, these would need to be reflected in the types of examples and elaborations used in the skills strand.

Before discussing the content of the proposed curriculum, however, I would like to make one observation about the construction of the subject. It is proposed to be taught for 20 hours each year. This does not make it a subject of a full year's length. It would at best amount to one lesson a week. This raises a number of issues, such as how it will fit into a school's timetable, whether it will be taught as a separate subject or carved up into bits and embedded in other subjects, such as history, and whether it will be treated seriously or dismissed as no more than a box that must be ticked to maintain a school's registration. If it were to be run as a half-year subject and counter-balanced with a separate half-year subject mandated by the national curriculum, this might give it a more secure life. An alternative would be for it to be run as a full subject over fewer years – preferably during secondary school. If it remains as it is, the most likely outcome is that it will be abandoned sooner or later simply because it does not conveniently fit into school timetables and will be characterised as over-crowding the curriculum.

Part 1 – Framework and Structure

Structure of the Civics and Citizenship Knowledge and Understanding Strand

One virtue of the current structure of the Knowledge and Understanding strand is its simplicity and clarity. Each of the three sub-strands of ‘Government and Democracy’, ‘Laws and Citizens’ and ‘Citizenship, Diversity and Identity’ is addressed each year in what appears to be relatively equal proportions of the curriculum for the year. While this produces a clear and elegant structure, the question remains whether it is appropriate when considered from the point of view of the aims and desired outcomes of the curriculum.

The first two sub-strands are knowledge-based and involve the teaching of factual content, whereas the third sub-strand is largely ideological in nature. It is not clear that the division between the first two sub-strands is warranted. While the sub-strand on ‘Laws and Citizens’ is focused primarily on the impact and enforcement of laws and the court system, it does not make a lot of sense to separate the courts from the system of government as a whole or to separate laws from the institutions that make them. The effect of this division between the sub-strands is to make the course less cohesive in each year, with teachers having to jump from one topic to a completely different topic without any connecting theme or development of ideas that would help the students to understand the relationship between the different parts of the democratic system. For example, in Year 9, the proposed curriculum jumps from a discussion of the role of political parties in government and influences on voters at election time, to the hierarchy of the court system and principles of justice. In Year 10, the curriculum jumps from Australia’s global role to the role of the High Court in constitutional interpretation. A preferable approach would be to strip away the division between the first two sub-strands and to approach the issues taught in each year in a more thematically linked manner.

The issues arising in relation to the third strand, ‘Citizenship, Diversity and Identity’ are different. Civics and citizenship courses have previously been criticised or even dropped altogether from the curriculum because of concerns about their ideological nature – be it jingoistic patriotism, political propaganda or the imposition of theories of political philosophy. Civics courses are often seen as promoting a party-political agenda or a broader political and ideological world view. They seek to impose ‘values’, or perhaps more correctly social norms of behaviour – in this case those concerning social cohesion, acceptance of diversity and the development and appreciation of separate identities.

While the choice of those particular values or norms may be fine in their day, it must be recognised that values and norms tend to change over time and are also vulnerable to being hijacked for political ends. This is apparent merely from looking at the words used in the proposed curriculum. They are somewhat different from the type of words that would have been used ten years ago. For example, there is an interesting rise in references to religious identity (for example, in Version 6.0 of the curriculum², dated 18 February 2014, the terms ‘religion’ or ‘religious’ are used 21 times, ‘multi-

² Please note that Version 6.0 has been superseded by the current version of the Australian Curriculum: Civics and Citizenship, Version 7.1 dated 25 August 2014, can be accessed at: <http://www.australiancurriculum.edu.au/Download/F10>

faith’ is used 7 times and ‘secular’ is used 9 times) – and a fall in references to race and multiculturalism (with multiculturalism being used 6 times and race or racial being used only twice). There are real risks in bringing such a course into disrepute if it is seen as ‘freezing’ a particular point of view in the curriculum and attempting to produce ideological clones who all subscribe to a particular view of Australian identity and citizenship.

The other problem with the third sub-strand is that it appears to be repetitive, unlike the rest of this strand. There are really only so many times that one can be told to be respectful of the identities of others, discuss how different factors affect the formation of identities, and discuss notions of ‘shared values’ and ‘belonging’. There is much to be said for the proposition that the Australian Curriculum: Civics and Citizenship should focus on building up the knowledge and understanding of students of the system of government and the skills to participate in it, so that they are empowered to perform their role as citizens in an informed and competent way. Hence, one could focus instead on the more informative and less ideological aspects of this sub-strand, such as the parts about who may be a citizen, the rights and responsibilities that flow from citizenship, how people may be active citizens through the medium of community groups, the contribution that community groups may make to society, and the like. One could also reduce the time spent overall on this sub-strand and adjust the balance, spending more time on it in the primary years where lessons about respecting others, accepting difference, tolerance, co-operating with others and finding common ground are already commonly taught and attitudes are formed. In any case, values and norms are not readily ‘taught’ as such, but are instead learnt and absorbed through students’ experience of school governance and expected behaviour within the school.

For these reasons, it may be better to disband the separation between the sub-strands, at least to the extent that the separation into three sub-strands requires each to be addressed in each year and in relatively equal proportions. This would leave more room in the secondary years to cover some of the content that appears to be missing from the first two sub-strands (to be discussed below), avoid the problem of repetition in the third sub-strand, reduce the risk of accusations of ideological bias and produce students with a better understanding of the system of government, which will empower them to be active and competent citizens.

Part 2 – Content and Sequencing

If the aim of the Australian Curriculum: Civics and Citizenship for Year 3 to 10 is to enable ‘students to become active and informed citizens who participate in and sustain Australia’s democracy’, then the ‘knowledge and understanding’ strand of the curriculum needs to be assessed by reference to the extent that it is likely to fulfil that aim.

Elections and referenda

The most critical and obvious areas that need to be addressed are those where citizens directly and compulsorily participate in Australia’s democratic system through voting in elections and voting in referenda to change the Constitution. In most other countries, where voting is voluntary, one of the main aims of the civics and citizenship curriculum is to encourage people to vote, resulting in increased voter participation. Indeed, the effectiveness of a civics and citizenship curriculum is often judged, rightly or wrongly, by reference to voter participation amongst young people. In Australia,

compulsory voting changes this focus somewhat, although not completely. While there is still a problem with getting young people to enrol to vote (although this is now being ameliorated by new methods of automatic enrolment), the primary issue in Australia is ensuring that when people vote they are capable of making an informed choice and that they understand the system sufficiently to make their vote give effect to their wishes.

The Australian Curriculum: Civics and Citizenship covers voting and the electoral system quite well in Year 5 and then deals with referenda and constitutional reform in Year 7. In Year 9 there is also a discussion about the influences on voters and the way they make their choices. In all three cases the content covered seems to be worthwhile and well-considered. The main problem is one of timing. The key teaching about the voting system, including quite complicated issues (for example, ‘discussing the democratic ideas behind preferential voting and proportional representation’) occurs in Year 5. This is far too early. First, at that stage the treatment of voting is likely to be relatively superficial. Secondly, it will most likely be forgotten or disregarded once students reach secondary school. By the time that students actually vote from the age of 18, they are unlikely to remember much of anything that they studied in Year 5.

On that ground, given that voting is the most crucial role of a citizen in the democratic system, there is much to be said for re-positioning or re-visiting the discussion of voting later in the curriculum. While it is generally preferable not to repeat content, if there were any area in which repetition might be justified, it would be in relation to voting. If one were to revise the curriculum in a comprehensive manner (see the suggested arrangement in Appendix B), then a preferable option would be to have a preliminary and principle-based discussion of voting in Year 5 and a more detailed and sophisticated analysis of voting and its political ramifications (eg in relation to upper Houses and the balance of power in State and Commonwealth Parliaments) in, say, Year 10 when it will be more meaningful for students who are becoming conscious of their looming voting responsibilities. This could be attached to the study of the influences upon voters, which would move up from Year 9.

Equally, the study of constitutional amendment and reform might best be connected to the study of the role of the High Court in constitutional interpretation. This is because an important democratic theme arises concerning the role of the people in constitutional change and the role of the High Court in changing the Constitution through interpretation when formal constitutional change has not been achieved.

Participation in civic life beyond voting

Another aspect of the aim of enabling ‘students to become active and informed citizens who participate in and sustain Australia’s democracy’, is to open their eyes to other ways to participate in civic life beyond compulsory voting. This is covered to some extent in Year 5 where students discuss how and why people volunteer for community groups and how they can use social media and other means to discuss ideas and work together to influence outcomes. It is also dealt with more explicitly in Year 8 where students consider how citizens can participate in government through contact with elected representatives, the use of lobby groups and direct action such as demonstrations and social

media campaigns. In addition, there is some discussion of political parties in Year 9, although not really in the context of how involvement in political parties can be a way of participating in civic life.

Consideration could be given to including in the citizenship aspect of the curriculum some exploration of other ways in which citizens can participate in civic life and support their local community, for example by volunteering their services to charities and service groups, becoming a Justice of the Peace, making submissions to public enquiries, attending public meetings, serving on local government bodies and providing voluntary help at schools and nursing homes. Citizens can also participate in and support Australia's democracy through their working lives, such as by serving in the armed services or as a reservist, teaching, representing Australia abroad as a diplomat or aid worker, or joining the police service or the public service.

Understanding the system of government

The other important aspect of a civics and citizenship curriculum is to give students a basic understanding of the system of government. This is necessary for them to be able to understand policies being proposed prior to elections and to be able to cast an informed vote. Such understanding is also essential to being able to make an informed judgment on proposals for constitutional reform in a referendum. It is not acceptable for citizens to base their vote on the dictum 'if you don't know, vote no'. Citizens should know, or at least be capable of informing themselves, so that they can make a free and informed choice about whether the Constitution should be changed. Only then do they truly fulfil their democratic responsibilities under the Constitution.

Further, such knowledge will aid citizens in their interactions with government. For example, a basic understanding of which level of government performs particular functions or provides particular services will help citizens know where to direct their complaints or problems and how to interact with the governmental system in order to resolve them or achieve change.

For these reasons, it is important that the civics and citizenship curriculum fulfil the role of educating students about the basic institutions of the system of government – the Parliament, the executive and the judiciary – their powers, the checks and balances on those powers and the functions they fulfil. Students should also understand how the various institutions interact with each other and the hierarchies involved.

The current proposed curriculum does some of this well, but in a patchy way. For example, there is a substantial consideration of the court system, how courts interpret the law, the enforcement of the law, principles of justice and the role of the High Court. There is also a strong focus on the Parliament and the enactment of statutes. It would be impossible, however, on the basis of the current proposed curriculum, for a student to come away with a balanced picture of how the system of government actually works in Australia. This is because there are some obvious holes in the curriculum. These include the executive, its powers and its relationship with the other arms of government, financial issues such as tax, spending and grants to the States, and basic structural issues such as which body has the power to enact particular types of laws and which law prevails when laws conflict.

The executive and its powers – There is very brief reference to the monarch and the Governor-General in Years 6 and 7, but the only references to the Prime Minister or the Cabinet are in the glossary (in defining other terms) and there are no references at all to the ministry or the public service. There is no consideration of executive power and how policies are implemented. Nor does it seem particularly clear how the system of responsible government works – such as the formation of government by the party or parties that hold the support of the lower House, ministers being appointed from amongst Members of Parliament and the accountability of the government to the people through the Parliament. While there is a brief reference to the ‘Westminster system’ in Year 6, it is unclear whether this involves an explanation of the system of responsible government.

Financial matters – Further, there is no reference at all to financial issues, despite these being key political issues, particularly at election time and budget time. Much of public debate concerning governmental matters turns upon the funding given to policies and programs and the taxes needed to support that funding. For example, the debate about the report of the National Commission of Audit and budget proposals would be enhanced if citizens had a basic understanding of how taxing, spending and the federal-State financial system operated. The curriculum makes no reference at all to tax (except in the glossary, regarding the responsibility to pay taxes), spending, the budget or grants to the States. These areas are obviously very complex and it would not be possible to explain them in detail to students, but the basic principles and structures ought to be comprehensible to students in the middle years of secondary schooling.

Legislative power and the hierarchy of laws – While there is reference to the federal system of government and the different roles and responsibilities of the three levels of government in Year 6 and an ‘exploration’ in Year 7 of ‘the division of powers between state/territory and federal levels of government using an issue such as water management, education or health’, it is not clear in either case whether they address the fundamental structural issue of the conferral of federal and State legislative powers or the hierarchy of laws. Students need to understand that the federal Parliament can only enact legislation on certain listed subject matters, whereas State Parliaments can legislate in relation to any subject at all except in the rare cases where the Constitution takes power away from them. They also need to understand that most of the Commonwealth’s powers are concurrent, meaning that the Commonwealth and the States can enact laws on the same subjects. A lack of public understanding of this point manifested itself in the debate on same-sex marriage, with many asserting that the Commonwealth had an ‘exclusive power’ to legislate with respect to marriage, when its power is only concurrent. Further, students need to understand that when valid federal and State statutes conflict, the federal law prevails, leaving the State law inoperative to the extent of the inconsistency.

In terms of the hierarchy of laws, it also needs to be made clear that statutes and subordinate legislation override the common law. While in Year 8 there is consideration of how statutes and the common law are made and some comparison of statute, the common law and delegated legislation, it does not appear to extend to which types of law prevail over others. This is a key issue for citizens in working out which law they are obliged to obey. It would seem to be far more important to understand who has the power to enact laws and the hierarchy of laws than it is to understand

technical details of parliamentary procedure, such as how many readings of a bill take place in its passage through the Parliament, as occurs in Year 6.

History

There is a notable absence in the proposed curriculum of any history that would explain the source of our system of government and the various struggles that caused its development. This may be because such matters are dealt with in the history curriculum. It may also be a consequence of having too little time.

Consideration might be given, however, to covering some of this history in the primary school years. For example, the 'Discovering Democracy Schools Materials Project' developed by the Curriculum Corporation in the late 1990s, set out some history-based units of study for middle and upper primary school students. For middle primary students there was a unit 'Stories of people and rulers' which discussed the development of democracy through stories ranging from the Pharaohs, Ancient Athens, King Canute and King John to the French Revolution. For upper primary students there was a unit on 'Parliament versus monarch' which covered Magna Carta, the English Civil War and the Bill of Rights 1688 in looking at the rise of Parliament and the imposition of limits on the powers of the monarch. There was also a unit on 'The Law Rules' which used stories from Australia's history about Governor Macquarie, convicts, the development of an independent judiciary and the imposition of the rule of law. While in a short course of this nature it would not be possible to examine the historical background in any depth, there may be value in sketching in some of it in the primary years as a starting point for discussion of subjects such as rules, voting, democracy and fairness.

Accountability agencies and the protection of other rights

While not being absolutely essential for inclusion it would still be valuable if students could be made aware of different types of accountability and watchdog bodies to whom they can complain to assert their rights or claim protection. For example, many students have phones and it would be helpful for them to be aware of the Telecommunications Consumer Protections Code and that they can make complaints to the Telecommunications Industry Ombudsman. Many students also have part-time jobs and it would be useful for them to know where to go if they are being exploited or harassed in the workplace. This is all part of understanding the law and exercising active citizenship.

While civil and political rights such as freedom of speech are important, they are often remote from the lives of students. There are many kinds of other rights. Consumer rights, for example, are directly relevant to students and have recently been explained in an engaging way on the ABC program 'The Checkout'. Consumer rights might be incorporated as an optional case-study when looking at different types of laws and their impact upon citizens.

Is there sufficient detail to guide teachers?

Brevity is a virtue, as is flexibility. The description of the curriculum should not be burdened by great detail, as this would make it too rigid and prescriptive and constrain good teachers from developing their courses in ways to make them contemporary and relevant to their students. However, there are parts of the proposed curriculum where it is very difficult to understand the scope of what is intended and where more guidance for teachers (not to mention parents and students) is needed. This is a matter of particular concern given that the curriculum is new and will be taught by teachers

who have not necessarily been trained in the subject area. This concern may be ameliorated by the development of good text books, but in the meantime, there may well be a need for further elaboration of some of the points in the curriculum.

Cross-curriculum priorities

There are three cross-curriculum priorities which are intended to be addressed in each learning area: Aboriginal and Torres Strait Islander histories and cultures; Asia and Australia's engagement with Asia; and sustainability. As a general principle I am concerned about the national curriculum being skewed to address these, or any, priorities. It is singularly inappropriate, for example, in subjects such as mathematics and physics.

In relation to the Australian Curriculum: Civics and Citizenship, there is no problem with including material concerning Aboriginal and Torres Strait Islander histories and cultures, as such issues naturally and necessarily arise in the teaching of civics and citizenship anyway (eg Aboriginal voting rights, constitutional recognition of Aboriginal and Torres Strait Islander peoples and the formation of Australian identity).

The inclusion of Asia appears more strained (see, for example, the tokenistic reference in ACHCK066 in Year 8 to 'attitudes to Asia' as being an influence on the shaping of Australian national identity and the incomprehensible elaboration in ACHCK053 which requires Year 7 students to consider 'how Australia's location in the Asian region influences interactions between Australians [and] those living in the region'). However, the comparison of Australia's system of government to that of an Asian country in ACHCK090 in Year 10 could be quite informative and is worth retaining.

The third priority, sustainability, is the most strained. It is applied in this proposed curriculum by way of taking environmental law examples to illustrate other issues. See, for example, ACHCK025, in which Year 5 students are directed to investigate 'whether environmental protection laws protect Aboriginal and Torres Strait Islander Peoples' traditional hunting and fishing rights and management of their Country/Place'. As noted below, however, it is quite a loaded issue and probably not the most appropriate way of considering the impact of laws on Aboriginal and Torres Strait Islander peoples. While environmental laws may well, justifiably, be used to illustrate issues such as federalism in the curriculum, other options might also justifiably be chosen, as it seems inappropriate to skew the curriculum towards one subject only.

Part 3 – Specific Comments on the Proposed Curriculum

This part of the report addresses each year of the curriculum, raising issues or queries or suggesting possible additions or extensions of the 'elaborations'. This is based upon the premise that the curriculum will remain essentially the same, but with some tweaking. For a more substantially revised format of the curriculum, see Appendix B.

Year 3

In ACHC001 students learn about democratic decision-making, including everyone having both a say and a vote and no one being excluded. One point that perhaps ought to be included is that not every decision ought to be made democratically. Sometimes parents and teachers make decisions without taking a majority vote and this is still fair.

In ACHCK002, in the discussion concerning how rules can protect the rights of others, consideration could be given to the inclusion of a discussion about how it is sometimes necessary to protect the rights of minorities from the actions of the majority. Hence, the majority does not always rule. Similarly, in developing a set of 'fair rules', recognition might be given to the fact that it is not always fair to have one rule that treats everyone the same, if some people (for example, students with a disability) have different needs or would be unable to comply with the rule.

Year 4

In discussing local government in ACHCK011, consideration could be given to discussing how local government is chosen and by whom – for example, that it used to be chosen by ratepayers only, as they were the ones that funded the services that local government provides, but now all residents can vote, even though they don't all pay rates.

Year 5

The content of the Year 5 curriculum raises a number of concerns. ACHCK022 involves the discussion of 'the meaning and importance of key values of Australian democracy such as freedom, equality, fairness and justice'. First, to be pedantic, it appears inappropriate to describe 'freedom' as a value. It would probably be preferable to address the key principles of Australia's system of representative democracy.

More importantly, considerable guidance would be needed for these 'values' to be discussed in any sensible way. It is such a large subject that teachers might genuinely find themselves at a loss as to how to approach it. An alternative, given the intended exploration of the nature of democracy, might be to discuss how the system of representative democracy is intended to operate and perhaps contrast it with other forms of democracy, such as direct democracy.

In ACHCK023, if there is to be a discussion about elections and what makes a good representative, then probably some mention needs to be made of the role of political parties and their effect upon the stability of government.

ACHCK024 covers issues concerning elections well. However, the content seems to be too advanced for Year 5 of primary school. For example, 'discussing the democratic ideas behind preferential voting and proportional representation', if it is to be done properly, involves an advanced understanding of very complex voting methods and the outcomes that they achieve. Very few people in this country actually understand how proportional representation works (and it works differently at the Commonwealth level and among the different States). While it would be good to increase this number, it is fairly unlikely that this is going to happen in Year 5 at primary school.

As noted above, if the aim of this exercise is to develop active citizens who are capable of casting an informed vote and are competent in fulfilling their role as citizens, it would be far more helpful to address voting issues in such detail towards the end of the civics and citizenship curriculum, in Year 10. By this stage, voting will be more meaningful to them as they begin to anticipate actually casting their own vote. When they first vote after turning 18, they are more likely to remember what they studied in Year 10 than what they learnt in Year 5. While repetition in the curriculum is to be avoided if possible, it would be preferable to address the fundamentals of voting and elections in

Year 5, but return to the subject in Year 10 to provide a more sophisticated analysis of matters such as voting methods, voting rights, the influence and role of political parties and how to access, compare and assess party policies.

As noted above, in ACHCK025, students are directed to investigate ‘whether environmental protection laws protect Aboriginal and Torres Strait Islander Peoples’ traditional hunting and fishing rights and management of their Country/Place’. This seems to be rather out of place amongst the other more general ‘elaborations’ and also to be quite a loaded question. Presumably one is intended to conclude that environmental protection laws impede the exercise of traditional practices, but of course there are other laws that may permit and protect those practices, such as those concerning native title rights. This leads to a complex web of interacting laws along with the development of native title common law rights which is continuing to occur through new cases in the High Court. Even as a PhD topic, it would be extremely challenging. It would be extremely difficult for a teacher to deal with it fairly and accurately. If one wanted to address this issue, it might be better to investigate ‘the impact of laws on Aboriginal and Torres Strait Islander peoples, such as environmental laws, native title laws, statutory land rights and laws concerning sacred sites’. Then teachers could choose relevant and contemporary examples, without having to make legal judgments about the impact of particular types of laws on particular types of traditional practices. Even then, it is arguably a topic that is too complex for Year 5.

In ACHCS030 students are asked to compare ‘the number of electors in some state or federal electorates to discuss issues of fairness in elections’. This leads to complex issues about ‘one vote, one value’ and federation (for example, how seats are allocated under section 24 of the Commonwealth Constitution) and the extent to which variations in the number of voters are justifiable. It is a very interesting subject, but again, it would appear to be a bit too challenging for Year 5.

Year 6

ACHCK035 involves an overview of the institutions of government. It requires consideration of the ‘importance of the Westminster system and the Magna Carta in influencing Australia’s parliamentary government’. As noted above, this is the only real indicator in the curriculum of any attempt to explain from where current constitutional principles were derived. It is, however, at best a half-hearted or token reference. Further consideration needs to be given to the extent to which constitutional history can be addressed and how it fits in with the history curriculum.

ACHCK036 sets the laudable but ambitious task of ‘clarifying the roles and responsibilities of the three levels of government (local, state/territory and federal)’. The recent National Commission of Audit struggled to do this in five volumes. Again, the issues involving entwined roles and responsibilities are extremely complex and there is a risk that simplifying them will mislead students rather than aid their understanding. While this task is important and should not be excluded from the curriculum, teachers will need considerable levels of guidance in the content to be taught on this topic. It would also help to delay it in the curriculum until secondary school.

ACHCK037 deals with how state and federal laws are initiated and passed through the Parliament. It includes ‘discussing where ideas for new laws can come from, for example, in response to a

community concern’ as well as ‘investigating the stages of the passage of a bill’. The best way to turn students off the subject of civics and citizenship is to teach them purely mechanical things, such as the first, second and third reading stages of a bill. The procedures for the passage of a bill (other than the need for passage by each House and royal assent) are rather tedious and unnecessary for most to know. More important is knowledge about how those bills are debated and scrutinised, such as the role of parliamentary committees in scrutinising bills and proposing amendments to them and the ability of citizens to make submissions to those committees. Equally important is an understanding of the role of the executive in relation to the development of policies and the introduction of bills. Reference ought to be made to the role of Cabinet in approving the drafting of a bill to implement a policy and the role of the public service in drafting and implementing legislation.

ACHCK038 addresses the important issues of ‘who can be an Australian citizen, the formal rights and responsibilities, and shared values of Australian citizenship’. The first elaboration concerns how people become Australian citizens. It would probably be useful here for some account of the relevant history to be taught – for example, how there was no such thing as citizenship at the time the Constitution was enacted, with Australians being ‘subjects of the Queen’, how separate Australian citizenship came into effect in 1949 and how voting was confined to citizens in 1984, but other subjects of the Queen who were on the electoral roll at that time can still vote even though they aren’t Australian citizens. It would also be worthwhile dispelling the many myths about Aboriginal citizenship and voting rights at this stage.

Students are also asked to discuss ‘the Australian citizenship pledge to explore the values and dispositions that characterise Australian citizenship’. It is not clear what is meant by ‘dispositions’ in this context. The definition in the Glossary does not help. It appears to be a term used in curriculum documents, but to the extent that these documents are intended to be comprehensible to others, such as parents, the use of a more commonly understood term would be preferable. In discussing the pledge, it might be useful to compare it to the former oath of allegiance to the monarch and explore notions of allegiance. This could be included as a task under ACHCS045.

It is also unclear what ‘formal rights and responsibilities of Australian citizenship’ would be taught in ACHCK038. Again, some guidance would be needed for teachers. The Glossary lists, under ‘citizenship’, rights to protection, a passport and to vote and responsibilities to obey the law, vote and defend the country. Yet, it is more complex than that. Non-citizens also have the responsibility and the legal obligation to obey the law. It would not be helpful to suggest to students who are non-citizens that they do not have to obey the law as this is a duty confined to citizens. Further, some non-citizens can still vote and have the legal obligation to vote, whereas some citizens cannot vote (for example, some prisoners, citizens living outside Australia for a certain period and citizens under the age of 18). The relationship between voting and citizenship is therefore more complex than suggested.

Year 7

ACHCK047 requires students to discuss the ‘key ideas that underpin the Australian Constitution’ and the ‘advantages of having a written constitution’. Again, it is unclear what is meant by the ‘key ideas

that underpin' the Constitution – does it mean the principles of representative and responsible government, or more amorphous notions such as equality, justice and the rule of law, and if it is the latter, how are these ideas to be identified in concrete terms in the Constitution?

As for discussion of the 'advantages of having a written constitution', it might be more helpful to discuss flexible and rigid Constitutions – for example, what are the advantages and disadvantages of having an entrenched Constitution that can only be amended by referendum as opposed to a flexible constitution (such as that in the UK and New Zealand) that can be changed by ordinary legislation, or a hybrid constitution (such as in the Australian States) where some parts are rigid and others flexible?

ACHCK048 includes a discussion of the separation of powers. In this discussion, it would be helpful to discuss the weak separation between the executive and the Parliament that occurs as a consequence of the system of responsible government.

It also includes an exploration of the 'division of powers'. In the Glossary this term is defined by reference to the fact that the Commonwealth has been vested with specific powers while the States retain broad general powers. Presumably this is therefore where it is intended to discuss the Commonwealth's concurrent and exclusive powers, the States' plenary legislative powers and the way that conflicts between State laws and Commonwealth laws are resolved. If so, this should be made clearer in the 'elaboration'.

The third elaboration of ACHCK048 includes a description of the role of the Governor-General. Nowhere is the role of the Prime Minister, ministers or the Cabinet considered. Here may be a logical place.

The discussion of constitutional change in ACHCK049 is appropriate, but it would be preferable if it were taught in a later year.

In ACHCK052 it is not clear how one identifies 'Australian values' and their distinction from 'universal values' and 'human rights values', whatever any of these may be. Again, more guidance would be needed for any sensible discussion.

The third elaboration in ACHCK053 requires students to consider 'how Australia's location in the Asian region influences interactions between Australians [and] those living in the region'. It is not clear what this is intended to mean.

Year 8

ACHCK061 addresses the 'freedoms that enable active participation in Australia's democracy within the bounds of law, including freedom of speech, association, assembly, religion and movement'. This is a relatively narrow selection of traditional civil and political rights, but that at least has the advantage of making the subject more manageable.

If one is discussing 'freedoms', however, one needs to address 'freedom from what?' Consideration also needs to be given to the different sources of the freedoms and their effectiveness. For example, a freedom expressed in the Constitution either directly (for example, freedom of religion) or

indirectly (for example, the implied freedom of political communication) acts as a limitation on the powers of Parliaments and governments. Common law freedoms, however, can be overridden by a contrary statute, as long as the statute is sufficiently clear. It also needs to be made clear that for the most part freedoms do not amount to positive rights that can be exercised against others – for example, the implied freedom of political communication cannot be used to require another body to provide free publicity of a political communication. Most importantly, it needs to be recognised that rights and freedoms often conflict and that the most controversial issue is how to manage these conflicts – whether it should be a matter for Parliaments or judges to resolve.

In the examples given in ACHCK062 of direct action taken by citizens to participate in and influence the system of government, one might add constitutional challenges initiated by individuals. For example, constitutional challenges brought by Mr Bryan Pape and Mr Ron Williams have had a significant impact on our political system. See also the film *The Castle* for a fictional account.

In ACHCK063 students compare different types of laws and how they are made. The elaborations do not make clear, however, that students consider the hierarchy of these different types of laws – for example, that statutes will override the common law. This is an essential element of understanding the legal system in Australia. In addition, when considering delegated legislation, students should be made aware of the role of the Houses of Parliament in the disallowance of delegated legislation.

Year 9

In ACHCK075 political parties and their roles are finally discussed. When it comes to the term ‘mandate’, it is usually claimed by governments in the lower House that they have a mandate to implement their policies, even though the people deliberately voted against the governing party in the upper House in order to ensure that the government’s policies were at least scrutinised and amended or in some cases blocked. This raises the role of the Senate and State upper Houses and the fact that governments rarely hold majorities in upper Houses. In discussing political parties and the formation of government, one needs to address the role of upper Houses, the balance of power in those Houses and the role of independents and minority parties, especially when they hold the balance of power.

It is very useful that in ACNCK076 students examine how different strategies are used to influence voters and the formation of their voting choices.

In ACHCK078, in discussing factors that can undermine the application of the principles of justice, it would be useful for students to be made aware of actions that can cause trials to be aborted, such as publicising the prior convictions of a defendant or the actions of juries in trying to investigate matters themselves or accessing information about the trial on the internet. These are common problems, particularly in a digital age where even tweets can cause trials to miscarry. Students, as users of social media, should be made aware of the risk of committing contempt of court and why such actions undermine the fairness of criminal trials.

Year 10

In ACHCK091 students investigate ‘Australia’s involvement with the United Nations, for example, representation in the organisation and adherence to conventions and declarations that Australia has

ratified’. The wording is a bit awkward. Conventions which Australia has ratified give rise to obligations at international law but which only take domestic effect when implemented by legislation. Declarations, on the other hand, do not entail legal obligations and are signed, rather than ratified.

In ACHCK092 students explore ‘an example of a High Court judgment in interpreting and applying Australian law, such as the Mabo decision.’ Other options (although these directly address the interpretation of the Constitution) could include the Roach case regarding voting by prisoners; King v Jones regarding voting rights for eighteen year olds and who is an ‘adult’; the Williams No 1 case on the funding of chaplains in schools; and the Kartinyeri case concerning Aboriginal sacred sites and the construction of the Hindmarsh Island Bridge.

In ACHCK093 students ‘discuss how international conventions and declarations have shaped Australian government policies with regard to Aboriginal and Torres Strait Islander Peoples’. Again, it needs to be clarified that the obligations in treaties only take domestic effect in Australia if they are implemented by statute, whether by the Commonwealth or State Parliaments.

Part 4 – International Comparisons

For the purposes of comparison with curricula in other countries, the countries chosen for this report are England (because of the close relationship between the Australian and English systems of government) and Finland and Korea, which are the countries whose students tend to perform best in international testing of civics and citizenship.

England

In England, citizenship became a statutory subject in the English National Curriculum in 2002. It is currently suspended in anticipation of a new national curriculum to be introduced later in 2014.

Citizenship is taught to students in ‘Stage 3’ and ‘Stage 4’, which is the equivalent of Years 7 to 10 of secondary school. It was a compulsory subject until its recent suspension.

The curriculum covers a large proportion of the same material as the proposed Australia Curriculum: Civics and Citizenship. This includes: voting and elections; influences on voting, including the media and pressure groups; the role of political parties; notions of justice; the rule of law; how laws are made and the work of parliament, government and the courts; the role of citizens and parliament in holding government to account; actions citizens may take in democratic and electoral processes to influence decisions; comparison of parliamentary democracy in the UK with other forms of government; the role and operation of civil and criminal law in the justice system; institutions of the justice system, including police, courts, lawyers, prisons and probation services; freedoms, rights and responsibilities; the history of the development of and struggle for different kinds of rights and freedoms; international human rights; identity, cultural diversity and community cohesion; the role of the voluntary sector; sustainable development and the impact of policies and practices on the environment; and international challenges and disagreements about inequalities, sustainability and use of the world’s resources. The UK curriculum also addresses matters particularly relevant to the United Kingdom, such as devolution in Scotland, Northern Ireland and Wales and the relationship of the United Kingdom with both the European Union and the Commonwealth.

Interesting differences in the UK curriculum include the following:

- In relation to rights, a wider range of rights is considered and there is a greater emphasis on the balancing of competing rights. Students are asked to investigate ‘ways in which rights can compete and conflict and understand... that hard decisions have to be made to try to balance these’.
- Economic and financial issues are addressed. Students are asked to consider ‘how economic decisions are made, including where public money comes from and who decides how it is spent.’ They are also asked to consider ‘the difficult decisions made by those in power when setting priorities, and raising and spending public money, for example balancing funding of education, health and welfare for all, with fair taxation and a healthy UK economy’.
- An emphasis is placed in the UK curriculum on balancing ‘competing and conflicting demands’ and an understanding that ‘in a democracy not everyone gets what they want’.
- There is also a more explicit and sophisticated understanding of fairness and justice, i.e. that it can mean treating everyone the same but it can also mean treating people differently where there are relevant differences that need to be accommodated.
- There is greater consideration of the executive, including the ‘roles of government and opposition and cabinet decision-making’.
- The curriculum also addresses the ‘rights and responsibilities of consumers, employers and employees’. This includes ‘the role of the individual in the economy and the right to representation in the workplace’.

Finland

Finland is one of the best performers in international testing in the area of civics and citizenship. It covers civics and citizenship in two separate subjects: Ethics and Social Studies.

The subject of Ethics deals relevantly with culture, identity, ethical and moral choices, principles of human rights, tolerance, justice and sustainable development. It introduces students to different cultures and world views, political ideas and ideologies, ‘positive multiculturalism’, ‘justice as a social, global and ecological issue’, and the concept of being a ‘good citizen’ as a Finn, a European and a citizen of the world.

The subject of social studies covers politics, economics and legal studies. Like Australia, it covers voting, elections and the political system, public services and the judicial system. However, the material tends to be presented in a particularly ideological way. For example, emphasis is placed both on the importance of the welfare state and the promotion of welfare, as well as learning to ‘appreciate the value of work’ and the importance of entrepreneurship ‘as a source of society’s well-being’. Students analyse the effects of social decisions on the lives of citizens and how to exert an influence on decision-making. There is a far greater emphasis on economics at the personal level (eg household economics, managing finances, debts and insolvency, guarantees and understanding the rights of consumers and workers) and at the national level (monetary policy, incomes policy, market forces, international trade, taxation, public finances, unemployment and inflation). There is also a strong emphasis on security, including foreign policy and defence. The subject also addresses the role of the European Union and other institutions, such as international courts.

South Korea

In South Korea, the relevant subjects are Moral Education and Social Studies. The subject of Moral Education is largely ideological in nature. The English translation of this curriculum states that it is a response to the concern that individuals are ‘holding confused values and society is falling apart’. It seeks to ‘consolidate moral grounds for societal consensus’. In doing so, it deals with matters such as honesty, integrity, abstinence and filial piety. It emphasises etiquette and good manners as an important aspect of Korean culture. It includes classes on keeping one’s promises and how to express appreciation. There is a strong theme of patriotism throughout, including the desire for unification with North Korea through peaceful means and the ‘love of people of the same ethnicity’.

‘Moral Education’ includes an emphasis upon sustainable development and recognition of the ‘reality of environmental crisis’. The curriculum includes criticism of consumption-oriented lives, self-pride and addiction. Interestingly, there is a unit on the avoidance of computer-game addiction. From a citizenship point of view, there is discussion of the contributions that citizens can make through community service, public service and military service. There is also a more nuanced consideration of the need to balance individual freedoms and communitarian values and the expression of concern about excessive emphasis on individual freedoms and rights. Students also consider distributive justice, welfare and cases of ‘valid civil disobedience’.

The Social Studies subject is divided into history, geography and social sciences. It is the social sciences area that primarily covers civics. It covers similar ground to the proposed Australian Curriculum (such as voting and elections, citizen participation in public life, human rights, the legislature, the judiciary, the legal system and the separation of powers). The most interesting difference is, again, a much stronger emphasis on developing an understanding of economic matters at the national and personal level. This commences as early as primary school and is taught in both Grade 4 and Grade 6. At the personal level, it involves consideration of decisions about consumption and saving. Consumer rights are also addressed. At the national level it involves, in Grade 6, developing an understanding of the Korean economy and analysing how the economy changes. It distinguishes the roles of the entrepreneur, the labourer and the government and their contribution to international competitiveness. By Grade 9 students are discussing the market economy, economic rules and responsibilities, national economic growth, prices and incomes, unemployment, international transactions and exchange-rates. Students are even asked to ‘apply the constitutional law articles of civil rights and the economy in understanding the basic institutional principles of the market economy, such as the right to private property, freedom of economic activity, and pursuit of private profit.’

Conclusion

All three countries place greater importance on economic literacy, at both the personal and national level. This is one of the more glaring gaps in the proposed Australian civics curriculum. It is interesting to note that the Koreans, in particular, do not consider such matters beyond the competence of even primary school children.

All three countries also tend to have a more sophisticated approach to rights than in the proposed Australian Curriculum, because they do not simply address what those rights may be, but how they conflict and how they must be balanced against each other.

The Korean and Finnish curricula include much more content on morals and ethics and also tend to be more ideological in nature. This is in part a reflection of the fact that they teach 'Ethics' and 'Moral Education' as separate subjects and therefore have more time to dedicate to them. This does not mean, however, that such matters should be inserted into the content of the Australian Curriculum: Civics and Citizenship, especially given that this subject is only to be taught for 20 hours a year in Australia.

Part 5 - Conclusion

The proposed Australian civics and citizenship curriculum has clearly been developed in a thoughtful and logically structured manner. It does, however, have some gaps in content, noted above, which should be addressed. Further, greater guidance is needed for teachers in relation to some of the less concrete material, such as values and principles. A more sophisticated assessment of how rights and values might conflict and how such conflicts should be resolved is also needed. There are also some problems with the age-appropriateness of topics and their sequencing, as discussed above.

Attached, at Appendix B, is an alternative structure, if a major re-structuring of the proposed curriculum were to be pursued in the future.

Finally, if taught well, the civics and citizenship curriculum could form the foundation for elective subjects in Years 11 and 12 on economics and politics. It would be beneficial if students could extend their civics knowledge into an optional course on politics in Years 11 and 12, for which they would be well-equipped with a strong grounding in the system of government in Australia.

Appendix A - Glossary

Some of the definitions in the Glossary to the proposed Australian Curriculum: Civics and Citizenship are misleading or contain contentious propositions.

‘Australian Government’ is said to refer to the federal and national government of Australia, ‘[p]reviously known as the Commonwealth Government’. As far as many are concerned, it is currently known as the ‘Commonwealth Government’ (or more formally the Government of the Commonwealth of Australia), and such references can be found in a great deal of current academic literature about the Constitution and politics. Indeed, the term ‘Commonwealth Government’ is used elsewhere in the Glossary in the definition of ‘Division of Powers’.

The term ‘Australian Government’ was adopted by Prime Minister Whitlam as a way of blurring the distinction between the Commonwealth and the States in order to assert that the ‘Australian Government’ could advise the Queen about Australian State matters as well as Commonwealth matters. Neither the Queen nor the United Kingdom Government accepted this terminological sleight of hand, and State matters continued to fall outside the advisory jurisdiction of Commonwealth ministers, both before and after the enactment of the Australia Acts 1986. Instead, State Premiers now advise the Queen about State matters – not ministers of the ‘Australian Government’.

Given the contentious nature of the assertion, it might be better to say in the glossary that ‘Australian Government’ means ‘the national government of the Commonwealth of Australia, which is also known as the federal Government or the Commonwealth Government. It was established by the Commonwealth of Australia Constitution Act at the time of federation.’

‘Burden of proof’ – This definition is unclear. A better version is to be found in the South Australia Legal Services Commission’s Glossary of legal terms, which defines burden of proof as: ‘the obligation to prove what is alleged. In criminal cases, this obligation rests on the prosecution, which must prove its case beyond reasonable doubt. In civil cases, it rests on the plaintiff who must prove his or her case on the balance of probabilities. Sometimes, however, this burden shifts, for example, where the defendant raises particular defences’.

‘Citizen’ – It is not clear how one can be a citizen of an ‘entity’. One can, however, be a citizen of a ‘polity’.

‘Citizenship’ – The second paragraph of this definition states that ‘Citizenship is also understood as membership of social, political, national or community groups that carries with it rights and responsibilities, and duties and privileges, and is guided by social virtues and encourages active participation.’ This is unclear. If a person is a member of a political party, does it make him or her a citizen of that party? Does membership of an ethnic community group make a person a citizen of that group?

‘Constitutional Monarchy’ – This definition states that the monarch acts ‘within the guidelines of a constitution and the advice of an elected government, which constrain the monarch’s powers.’ It

would be more accurate to say that a constitutional monarch acts according to law and as required by the Constitution and that in exercising his or her discretionary powers, the monarch acts on the advice of responsible ministers, except in exceptional cases.

‘Democracy’ – This definition is quite awkward. It might be better to say that a democracy is a system of government where power is vested in the people, who may exercise it directly or through elected representatives, and who may remove and replace their political leaders and government in free and fair regular elections.

‘Dispositions’ – This definition states that ‘dispositions’ are the ‘intentions to act or behave in a way that is influenced by the knowledge, skills and values acquired as a democratic citizen’. It is unclear what this means. What is a ‘democratic citizen’? How can a disposition be an intention to act?

‘Governor-General’ – This definition states that the Governor-General is the ‘head of state’, which is a highly controversial proposition. (Note that the definition of constitutional monarchy earlier in the Glossary stated that the monarch is the head of state.) The proposition that the Governor-General was head of state was raised by monarchists in the 1990s as a means of undermining a republican campaign for an Australian as head of state. The Queen, however, continues to regard herself as head of state of Australia and has addressed the United Nations as Australia’s head of state. A less controversial and a more accurate definition of the Governor-General would provide that he or she is:

the representative of the monarch at the federal level in Australia. The Governor-General exercises most of the monarch’s powers in relation to Australia at the federal level, while State Governors exercise those powers with respect to the Australian States. Other powers are conferred upon the Governor-General by the Constitution and statutes. In exercising his or her powers, the Governor-General is bound by convention to act on the advice of his or her responsible ministers, except in relation to matters such as the appointment and dismissal of the Prime Minister.

‘Mandate’ – This definition describes a mandate as ‘the authorisation to act in a particular way on a public issue given by the electorate to its representative or government’. The term ‘authorisation’ implies some kind of formal conferral of authority to act. It might be more accurate to describe it as ‘implied approval’ to act in a particular way on a public issue given by voters through their actions in electing their representatives. As noted above, in reality voters will often vote to support a particular party forming office even though they do not approve of all that party’s policies. This is shown by the way people vote differently in relation to the Senate. It is therefore difficult to claim that the voters ‘authorise’ the implementation of those policies. At best, a party can claim implied approval. It would be easy to register a mandate if the major parties were required to list their five main policies on the back of the Senate ballot paper and allow voters to tick boxes to indicate which ones they approved. However, the parties are not willing to do so, as they wish to proclaim mandates without testing them.

‘Parliamentary democracy’ – This definition is not clear. I assume that what is intended is to

distinguish a parliamentary democracy from a presidential democracy (such as the United States). A parliamentary democracy is one where the executive is formed from and responsible to the Parliament and the head of government (for example, the Prime Minister) is different from the head of state (e.g. the Queen). In contrast, a Presidential democracy is one where the executive is separate from the legislature and the President is not only head of state but also holds the primary executive role of head of government.

‘Proportional representation’ – The first part of this definition states that proportional representation means the ‘representation of parties, groups or individuals in a legislature in proportion to the number of votes they receive in an election.’ This is far too simplistic. It does not take into account the distribution of preferences or thresholds. Unlike countries such as New Zealand, our system of proportional representation in the Senate does not accurately reflect the proportional level of support received by a candidate or a party. For example, at the last election Ricky Muir won a Senate seat in Victoria with 0.51 per cent of first preference votes. His election was hardly a reflection of his proportionate support in the community. It is very important that students understand that preference flows and deals between parties can mean that if they vote above the line in Senate elections, they may end up electing a candidate that they strongly oppose.

‘Referendum’ – It should also probably be added to this definition that a State may also hold a referendum to approve changes to its Constitution. Further, direct public votes on non-constitutional matters, such as day-light saving, conscription or shop trading hours, are technically known as plebiscites and are not constitutionally binding on governments.

‘Rights and responsibilities’ – There seems to be an assumption in this definition and throughout the curriculum that obligations to vote and pay tax and the like are attached to citizenship, whereas in fact, all people in Australia, whether citizens or non-citizens, have to obey the law. If people live here and earn an income here, they have to pay taxes too, regardless of whether or not they are citizens. Non-citizens also have the same rights to freedom of speech, although most do not have the right to vote (but some still do).

‘Rules’ – This definition describes rules as ‘guidelines for behaviour’. This does not appear to be accurate. A guideline is a suggestion as to how people ought to behave, whereas a rule is a requirement to behave in a particular way.

‘Separation of powers’ – This definition describes the separation of powers as the ‘acknowledged division between the executive, legislature (parliament) and judiciary. These separations act as checks and balances on each other to prevent excessive concentration of power in one group’. It might be clearer to say: ‘The separation of powers is a doctrine that the three arms of government – the executive, the legislature (parliament) and the judiciary – are separate and independent, with powers that act as a check and balance on each other. In Australia, the separation between the executive and the legislature is weak because the executive is drawn from the legislature, but the separation between the judiciary and the other two arms of government remains strong and is enforced by the courts.’

‘Statute (statutory law)’ – This definition describes a statute as a ‘written law (in the form of a bill) that has been passed through all stages by Parliament, has received the monarch’s (or monarch’s representative such as Governor-General or Governor) assent and has been proclaimed.’ Not all statutes require proclamation – many simply commence upon royal assent. It might be better to say: ‘In Australia, a statute is a written law, also known as an Act of Parliament or legislation, that commences as a bill, is passed by the Parliament and has received royal assent (by the Governor-General or the Governor, or in very rare cases directly by the monarch). A statute may commence upon royal assent, or a specified date, or upon a date declared in a proclamation.’

‘Westminster system’ – This definition is fairly good, but it could be helpful to connect it to the commonly used term of ‘responsible government’. Perhaps it could say instead: ‘The Westminster system is a system of parliamentary government, also known as responsible government, which evolved in England and was adopted in its colonies, including Australia. It is based upon the principle that the executive government is responsible to the people through the Parliament. The executive government is formed by those who command the support of the lower House of Parliament. Ministers, including the Prime Minister, are members of a House of Parliament and are accountable to it. There is a separate, largely ceremonial, head of state, an independent public service and an independent judiciary that applies the rule of law.’

Other definitions:

If this civics course is to cover the executive and government finances, then the glossary might be expanded to cover terms such as Cabinet, Ministry, Executive Council and Appropriation and Budget. Alternatively, one could include a definition of ‘Executive’ that incorporates most of these terms along the following lines: ‘The Executive, also known as the Crown or the government, develops and implements policies and administers the law in Australia. It comprises the Governor-General (or Governor at the state level), the Ministry and the public service. At the federal level, a smaller group of the most important ministers forms the Cabinet, which makes major policy decisions, including decisions about spending, appointments and introducing legislation. As State ministries are smaller, often the full ministry comprises the Cabinet. Many Cabinet decisions need formal approval by the Governor-General or Governor. This is done through a meeting of the Executive Council, which comprises ministers and the Governor-General (or Governor, at the State level). Normally two or three ministers are nominated to represent the Ministry at an Executive Council meeting to advise the Governor-General or Governor to approve the decision which has been made by Cabinet. Once it is approved, the decision is given effect by the Public Service.’

Appendix B – An alternative structure

If one were to reconsider the structure of the civics and citizenship knowledge and understanding strand of the proposed curriculum, one might take the following approach:

- remove the strict division into sub-strands for each year;
- move more of the ‘citizenship’ material into the primary years and reduce the amount of ideological material;
- transfer some of the more complex governmental material into the secondary years from the primary years;
- allocate the detailed analysis of voting in elections and referenda to the last secondary year, so it is closer to the time when these responsibilities will be exercised by students;
- approach each year on a more thematic basis so that there are links between the different topics covered;
- introduce some history into the primary years to give context to governmental issues; and
- fill the gaps in the curriculum by including material concerning the executive and government financial issues.

If this were done, the structure of the curriculum might look as follows:

Primary years

Year 3	<ul style="list-style-type: none"> • Democratic decision-making • Rule-making • Active participation within communities
Year 4	<ul style="list-style-type: none"> • The purpose and role of Local Government • Rules and laws • The importance of laws • Cultural, social and religious identity • Perspectives on Australian national identity, including symbols and events (e.g. Anzac day, Australia Day).
Year 5	<ul style="list-style-type: none"> • History of democracy – <i>Magna Carta</i>, the rise of Parliament, limitations on the monarch’s powers, the expansion of voting rights • Democracy and the fundamentals of elections • The impact of laws on citizens • Law enforcement officers – their roles and responsibilities
Year 6	<ul style="list-style-type: none"> • History of citizenship, allegiance and being subjects of the Queen • Citizenship – criteria, rights and responsibilities • National identity and belonging in a multicultural society • Participation and contribution of groups, including community and religious groups, in public life • Means by which citizens can participate in civic life and contribute to their community or nation • Global citizenship

Secondary years

<p>Year 7</p> <p>Constitution fundamentals and Parliament</p>	<ul style="list-style-type: none"> • The Constitution – background, source, current status and entrenchment • Institutions of government, roles and powers – monarchy, Governor-General, Cabinet, Parliament and courts • Westminster system/responsible government • Separation of powers • Federalism - roles and responsibility of three levels of government • Federal grants to the States and the impact on federalism • Division of powers between Commonwealth and States • Passage of laws by Parliament
<p>Year 8</p> <p>Laws, Rights and Freedoms, international</p>	<ul style="list-style-type: none"> • The making of statutes and common law • Categorising types of law – criminal law, civil law, customary law • The hierarchy of laws • Freedoms – free speech, association, assembly, religion and movement and the resolution of conflicts between them. • Australia's global role – peacekeeping, UN, international organisations • Australia's international legal responsibilities
<p>Year 9</p> <p>Executive and courts</p>	<ul style="list-style-type: none"> • Executive power – the Prime Minister, Cabinet Ministry and Executive Council • The development and implementation of policy and the role of the public service • Executive spending, parliamentary appropriations and the budget • The court system and how courts interpret law, resolve disputes and make law • Principles of justice – equality before the law, independence, right of appeal • Principles of the legal system – the rule of law, presumption of innocence, fair trial, legal representation
<p>Year 10</p> <p>Elections and referenda</p>	<ul style="list-style-type: none"> • Electoral system and voting • Influences on voters – the media, opinion polls, advertising, interest groups, political parties and social media • The role of political parties and independents in government • Participation of citizens in democracy, lobbying, direct action, etc. • Process for constitutional change and referenda • Role of the High Court, including constitutional interpretation • Comparison of Australian democracy with an Asian country

14. Economics and Business (Year 5 to Year 10) – Professor Tony Makin and Dr Alex Robson

Executive Summary

This report reviews the current Australian Curriculum: Economics and Business with particular attention to the economics component, given that economics provides a basis for business studies broadly defined. In assessing the existing curriculum document, attention was paid to the nature of the economics and business content and its relevance for contemporary economic and business behaviour.

The report concludes that the curriculum document as it stands is grossly deficient and needs rewriting. Compared for instance to overseas curricula, specifically those of Massachusetts in the United States and Ontario in Canada, Australia's curriculum lacks balance and omits core economic principles and essential material across a range of topics. It also finds that the curriculum document is too wordy, is poorly expressed, and contains many definitional errors in relation to important economic concepts.

Combining economics and business in one curriculum document is unusual by international standards and a case can be made for separating them. Basic descriptive material about the economy could be introduced in late primary or early high school years, with more conceptually challenging economic concepts to follow in later years. With respect to business topics to be covered, there could be an emphasis on elementary financial literacy in early high school. Basic accounting, marketing and related business material could be taught subsequently.

Mainstream economics topics that warrant inclusion in a new curriculum are an account of Western economic history, the rise of Asia in the twenty first century, international economic institutions, and the traditional themes of supply, demand, prices and the market system, entrepreneurship, and the positive contribution the private sector makes through job creation and income generation, the role of government, the national economy, the role of money, banks and financial markets, and international trade. Business topics that also warrant inclusion include basic financial literacy, the various kinds of business, practical ways firms can improve productivity, as well as an appreciation of the importance of marketing and exposure to basic accounting terms.

While covering mainstream topics, a new curriculum should also highlight unique characteristics of the Australian economy, as well as international institutions and the importance of international trade. Should space be limited for including all of the above specified topics in the Economics and Business curriculum in light of demands from other subject areas, consideration should be given to prioritising the economic history aspects within the history curriculum.

1. Introduction

This report reviews and evaluates the Australian Curriculum: Economics and Business (hereafter referred to as 'the curriculum'). The main focus of the review is on economics since economics provides the basis for understanding how business operates at the firm level, while the environment in which business operates is determined by economy-wide factors.

Economics relies on a relatively small number of straightforward ideas to explain the world around us. The primary role of an introductory economics curriculum should be to convey and explain the most basic ideas in both microeconomics and macroeconomics which are highly relevant to business decision making. Using concise, straightforward language and interesting examples, economics provides a coherent framework for explaining household and business behaviour and the role of government in the economy. By learning interesting concepts and facts, school students should begin to appreciate what business is and how firms operate in a market system to deliver goods and services, as well as understanding how economic principles may be applied to decision-making in their own lives.

This evaluation mainly addresses the content, consistency and balance of the existing curriculum. Our overall assessment is that the curriculum is not fit for purpose and needs rewriting. The document is too long, misdirected and poorly expressed. Moreover, the content of the curriculum is deficient in numerous ways. The shortcomings we have identified be classified under three main headings:

- Omission of key economics and business concepts and material
- Inclusion of inappropriate material
- Incorrect definitions or inadequate explanations of standard economic concepts.

2. Omission of Key concepts and Material

The curriculum either insufficiently emphasises or omits important topics central to understanding economic behaviour and the business environment.

Economics

There is no mention of the critical distinction between microeconomics and macroeconomics. Microeconomics covers the behaviour of consumers, households, workers, entrepreneurs, firms, the operation of markets goods and services, and the role of government in providing public goods and regulation, whereas Macroeconomics considers economy-wide variables including economic growth, inflation, unemployment, the banking and finance sector, international trade, exchange rates and monetary and fiscal policies.¹

There is no mention of the great economic thinkers, or reference to Adam Smith’s famous ‘invisible hand’, the idea of market equilibrium, or the key role of the price system in providing necessary signals for the allocation of resources and in decentralising information.

To understand the contemporary economy it is necessary to have some understanding of economic history. Economic history is also full of fascinating examples of basic economic principles in action (see Box 1).

The economic institutions of Western civilisation, the Industrial Revolution, the rise of Europe and the US, and more recently the phenomenal rise of East Asia (Japan, China, Korea, Hong Kong, and

¹ *Economics Standards for Australian Higher Education*, Australian Government Office for Learning and Teaching and Australian Business Deans Council, 2013.

Singapore), India and other emerging economies, including the Association of Southeast Asian Nations (ASEAN) economies, Brazil, Mexico and Russia are not mentioned.

Nor is the fact that the unprecedented reduction in poverty that has occurred in these economies over recent decades has been a direct result of market liberalisation and increased international trade. Within these economies and in the advanced economies, including Australia, the private sector accounts for the bulk of economic activity and is mainly responsible for creating employment and hence raising living standards.

The important role of entrepreneurs in starting and organising new businesses after identifying new products, processes, technologies and opportunities should also be covered. Reference could be made to well-known entrepreneurs who have literally changed the world through their innovations, for example Bill Gates (Microsoft), Steve Jobs (Apple), Mark Zuckerberg (Facebook) et al.

Students should be aware of key international economic institutions, including the World Bank, the International Monetary Fund, the International Labour Organisation, the Organisation for Economic Co-operation and Development (OECD), Asia-Pacific Economic Co-operation (APEC), and the Group of 20.

With the above as context, there should be more discussion of how the Australian economy and its key institutions such as the Reserve Bank of Australia, have evolved through time, before and since European settlement, including an account with reference to simple data of how living standards and consumer choice have risen markedly over the centuries.

There is no mention of the difference between long run growth and business cycles, recessions and booms, the terms of trade and the exchange rate (particularly relevant in Australia's case), or the role of institutions and technological progress as drivers of long term economic growth.

There is inadequate explanation of the role of the banking and finance systems of modern economies, in particular how financial institutions, including stock markets, act as intermediaries channelling saving from households to other households and business, especially for investment which adds to economies' productive capacity.

A key driver of economic activity since the beginning of human history – the gains from specialisation and voluntary exchange – is insufficiently emphasised. 'Outsourcing' is mentioned at several points, but there is no mention of 'insourcing' and yet every job that is outsourced from one country must, by definition, be insourced to another.

Students should also be aware of the importance of Australia's international trade for its prosperity and the fact that over 70 per cent of our trade is with countries that are members of the APEC grouping of Asia-Pacific economies. Australia's exports are mainly mineral and agricultural commodities, the most notable being iron ore and coal, accounting for over half of Australia's exports, whereas imports are mainly manufactures, such as vehicles, machines and household appliances.

Students should also know that of Australia's major trading partners, eight of the top ten are APEC members on the basis of two-way trade, with the top three - China, Japan and the United States - also the world's three largest economies.

The basic ideas of consumer surplus and market equilibrium are not mentioned; yet omitting such basic concepts means students fail to appreciate what modern markets achieve in satisfying wants.

It is difficult to see why studying primitive barter economies (which might best characterise economic activity in pre-settlement Aboriginal and Torres Strait Islander societies) should be prioritised over learning about comparative advantage, the sources of comparative advantage (for example, factor endowments) and the gains from specialisation and exchange.

There is little discussion of private property rights and the role that this and other institutions (such as the rule of law) play in facilitating specialisation, trade, saving and investment in physical and human capital. Students could better understand the differences and similarities between modern economies and primitive societies with reference to the role of property rights.

There should be more extensive discussion of the respective roles of the private and public sectors in the mixed, though primarily market-oriented, economy, what markets achieve and the role of government.

The curriculum needs to emphasise that a vibrant private (or business) sector is positive for the economy overall, as business provides work and hence income for the majority of households in the economy. Without private firms there would be fewer new jobs created and considerably less tax revenue available to fund the activities of the public sector in areas such as defence, education, health, roads and social welfare (including old age pensions).

Economic theory tells us that there are two basic rationales for public expenditure. These are, firstly, to correct for genuine 'market failure', which includes providing so-called 'public goods', and secondly to redistribute income. However, over-correction of perceived market failure leads to 'government failure' which lowers living standards in the long run.

Students should know that before the First World War, government spending in industrial economies as a proportion of gross domestic product was only around ten per cent. It grew strongly during the inter-war period, but accelerated fastest from 1960 due in large part to extension of welfare state benefits. The share of government spending in OECD economies now ranges between thirty and fifty five per cent.

Meanwhile, government spending has to be paid for via taxation and the nature of different forms of taxation. Issues that should be canvassed include how and on whom taxes are actually levied - for example, indirect goods and services taxes on consumers, versus direct income taxes on individuals and companies.

The concept of transaction costs is not mentioned, yet students are supposed to (in Year 8) look at the advantages and disadvantages of certain business ownership structures. However, the nature of business structures is best understood with reference to transaction costs.

It is also hard to see how students can understand the notion of ‘sustainability’ and natural resource depletion without understanding the role played by private property rights, as well as the role that market prices play rationing consumer demand and bringing forth additional supply.

Business

Elements of basic financial literacy could be introduced in early high school. This would include understanding what it means to pay bills, starting and managing a bank account, interest rates, the role and use of credit cards, what pay as you earn income tax, company tax and the Goods and services tax (GST) mean.

With specific reference to business, there is no mention of different types of business, such as corporations, partnerships, franchises or co-operatives.

There is also no mention of ways firms can improve productivity via staff training, different ways of managing, teamwork, investment in technology, or improved inventory management.

Some of the basic ideas of marketing could also be developed and applied to marketing a particular good, service or event as a practical application. The advantages of different types of marketing (print, radio, TV, billboards) could also be compared.

Finally, students should be familiar with basic terms in accounting, such as profit, loss, income, asset, liability, and be able to understand the most rudimentary income statements and balance sheets.

Box 1: Economic Policy Intervention in the Ancient World: Diocletian’s Price Edict

The Edict of Diocletian was issued in 301 AD by Roman Emperor Diocletian. The Roman currency had been debased in order to pay soldiers and public officials. As basic macroeconomic theory (specifically, the quantity theory of money) would predict, this resulted in inflation. To prevent prices rising Diocletian implemented massive price controls: he legislated for the control of the maximum prices for over one thousand basic commodities, manufactured goods and luxuries, and services. Again, as basic principles of economics would suggest, Diocletian’s policy failed to achieve its objectives: merchants either sold their goods illegally on black markets, used barter, or stopped producing altogether.

Source: DiLorenzo, T. (2005) ‘Four Thousand Years of Price Control.’ <http://www.mises.org/daily/1962>

3. Inclusion of Inessential Material

In addition to omitting crucial material, the curriculum lacks educational balance and includes inappropriate material. In particular, material related to the cross-curriculum priorities is included in an arbitrary and haphazard fashion. Examples include the following:

- The curriculum proposes that Year 10 students be taught in great detail about alternative measures to gross domestic product (GDP), as well as measures of economic inequality. However, this is inappropriate at such a rudimentary level as these topics involve advanced concepts best left out of a Year 10 curriculum, though could be covered in Years 11-12 or left until university level, where it is currently covered.

- The above topic has been included at the expense of more basic and more important topics in macroeconomics, such as the open economy, the sources of productivity growth, the causes of inflation and unemployment, and foreign investment.
- The benefits of government intervention are mentioned, but without discussion of ‘public goods’ or the costs of such intervention (such as the costs of taxes or government regulation), or what can go wrong with government decisions (that is the notion of ‘government failure’ which can be as significant as market failure).
- In covering the issue of ‘sustainability’, students are unlikely to fully appreciate its implications in terms of incentives, costs and benefits without exposure to the economics of excludable and non-excludable goods, rival and non-rival goods, property rights and the tragedy of the commons.
- There are numerous examples from history that can be used to illustrate the above ideas (see Box 2 below) and which are more likely to encourage a love of learning about economics, the joy of discovery, and a quest for knowledge and related skills.

Box 2: Private Property, the Mayflower and the Pilgrims

The story of the Pilgrims in the United States in the early 17th century is one of the successes of private property rights and is a useful illustration of the economic concept of free-riding. In *The Noblest Triumph: Property and Prosperity through the Ages*, Tom Bethell details how, under communal land stewardship, the Pilgrim community was afflicted by an ‘unwillingness to work, by confusion and discontent, by a loss of mutual respect, and by a prevailing sense of slavery and injustice.’ In a nutshell, the Pilgrims had encountered the classic free-rider problem taught in introductory economics. Governor William Bradford recorded the decision to change the arrangements:

‘So they began to think how they might raise as much corn as they could, and obtain a better crop than they had done, that they might not still thus languish in misery. At length, after much debate of things, the Governor (with the advice of the chiefest amongst them) gave way that they should set corn every man for his own particular, and in that regard trust to themselves; in all other things to go on in the general way as before. And so assigned to every family a parcel of land, according to the proportion of their number, for that end, only for present use (but made no division for inheritance) and ranged all boys and youth under some family. This had very good success, for it made all hands very industrious, so as much more corn was planted than otherwise would have been by any means the Governor or any other could use, and saved him a great deal of trouble, and gave far better content. The women now went willingly into the field, and took their little ones with them to set corn; which before would allege weakness and inability; whom to have compelled would have been thought great tyranny and oppression.’

Source: *The Founder’s Constitution*, <http://press-pubs.uchicago.edu/founders/documents/v1ch16s1.html>

4. Incorrect Definitions and Inadequate Explanations

Economics, like other disciplines, uses a number of concepts that are precisely defined. The main purpose of such precision is to avoid confusion, ambiguity, and errors of logical reasoning and judgement in personal financial decisions, business decisions, and economic policymaking: defining a concept incorrectly or applying it inappropriately can lead to significant negative economic consequences. Unfortunately the curriculum document incorrectly defines a number of fundamental economic concepts. Notable examples are:

- Efficiency - perhaps the most fundamental concept in all of economics - is defined incorrectly in the Glossary (see Box 1 below).
- Gross Domestic Product (GDP) is defined incorrectly as the value of all goods and services, whereas GDP is actually defined as the value of final goods and services.
- The term ‘comparative advantage’ is not mentioned. Hence, the document fails to distinguish between absolute and comparative advantage, a distinction vital to understanding international trade and investment. Instead, the curriculum discusses ‘competitive advantage’ and seems to equate this concept with absolute advantage, although ‘competitive advantage’ is not a term commonly used in economics.
- The curriculum defines a market as ‘the organised exchange of goods, services or resources between buyers and sellers’ which is too narrow. In light of the rapid expansion of online trading, many markets are inappropriately characterised as ‘organised exchanges’.
- An ‘externality’ is defined as a ‘cost or benefit associated with the production or consumption of goods and services that affects the wellbeing of third parties or society more generally’. However an externality is generally an uncompensated cost or benefit, an important part of any definition. Actions which result in compensated spill-over effects are not externalities.
- ‘Productivity’ is defined incorrectly, referring the reader back to the definition of efficiency, which is itself incorrect.
- The definition of ‘capital’ is restricted to physical equipment when in modern economies capital also includes human capital, intellectual property and knowledge.

Box 3: Economic Efficiency - An Example of the Curriculum Incorrectly Defining a Key Economic Concept

The curriculum’s Glossary defines ‘efficiency’ as ‘Producing goods and services using the minimum amount of resources; obtaining the greatest amount of goods and services from limited resources; avoiding wastage of resources.’

This definition focuses narrowly on productive efficiency or the supply side of the economy, and ignores consumer preferences and benefits. This is a crucial mistake: a business or economy could produce goods and services at minimum resource cost, but the goods and services might not be valued at all by consumers.

A broader, more appropriate and relevant definition of efficiency would take into account consumer benefits. However, as noted below, this would be difficult to incorporate into the curriculum as it currently stands, since there is no mention or discussion of the concept of consumer net benefits or surplus.

While all of this may seem pedantic, it is not. Poorly defined concepts give the overall impression that the curriculum lacks pedagogical rigour. Indeed, the main effect of these inaccurate definitions is to reduce the reader's confidence in the overall accuracy of the document and its fitness for purpose as a primary source document for teaching professionals and the wider education community. The failure to correctly define basic key economic concepts means the curriculum lacks educational rigour.

5. International Curricula Comparison

The Australian Curriculum was benchmarked against the curricula of the US State of Massachusetts (Massachusetts History and Social Science Curriculum Framework) and the Canadian Province of Ontario (The Ontario Business Studies Curriculum Grades 9 and 10). Of these the Massachusetts curriculum was more relevant for comparison, as the Ontario curriculum focused on limited aspects of relevance to business with scant attention to economics per se.

The Massachusetts curriculum document is broad ranging, covering history, geography, economics, and civics and government.² Its scope and sequence is comprehensive and its content, particularly as regards economics, addresses themes that could form the basis for the Australian Curriculum. Its overarching theme for economics is 'The growth and spread of free markets and industrial economies' which aims to instil concepts and skills for each grade in terms of 'the basic terms, principles and institutions of capitalist economies' with attention to 'the role of international trade in spreading ideas, customs and practices, as well as sparking new ones'.

Consistent with the above identification of themes missing from the Australian Curriculum, the Massachusetts curriculum includes the following:

From Grades 5 to 7

- How markets determined prices and how businesses operated in US colonial history
- The importance and examples of international trade, different currencies and exchange rates
- Key elements of a market economy and how individual households and firms follow their own self interest
- How standards of living vary across countries with reference to the standard GDP per capita measure

From Grades 8 to 12

- The role of financial markets in channelling funds from savers to investors
- The idea of opportunity cost

² It is noteworthy that the top two University Economics Departments in the world according to QS World University Rankings, Harvard first and MIT second, are based in Massachusetts.

- The benefits of competition to consumers
- Understanding of GDP, economic growth, unemployment, inflation.
- Supply, demand and market equilibrium prices
- Absolute versus comparative advantage and why international trade occurs
- How exchange rate changes affect competitiveness and purchasing power
- What fiscal and monetary policy means
- Understanding of the basic functions of government
- The role and functions of the central bank
- How government taxes and spending affect the budget and national debt

These themes are further developed in an elective Economics program in the Massachusetts grade 12 curriculum with particular attention to the themes of Scarcity and Economic Reasoning, Supply and Demand, Market Structures, The Role of Government, National Economic Performance, Money and the Role of Financial Institutions, and Trade. Each of these themes relate directly to the topics identified as missing in the Australian Curriculums in section 2 of this particular report.

Although we judged the Ontario business studies curriculum less relevant given its neglect of important economics themes, it does include specific themes that could be considered for a more comprehensive economics and business curriculum, including types of business enterprises, ways of improving productivity, marketing and accounting concepts.

6. Concluding Remarks and Recommendations

Our overall assessment is that, as it stands, the Australian Curriculum: Economics and Business does not represent what economics and business students should be taught in schools. The document omits essential concepts, introduces less meaningful and unbalanced material, while getting basic economic definitions wrong. Having a combined economics and business curriculum is unusual by international standards and there is a case for separate documents. The bulk of the proposed Economics material, some of which is conceptually challenging, could be taught, appropriately sequenced, in high school. However, reference should be made to capitalism, Western economic history, the rise of Asia and features of the Australian economy in late primary school.

Meanwhile, elements of Business, such as those addressing basic financial literacy, could be taught during the early high school years, with the remainder, including basic accounting and marketing principles taught later in high school.

The present curriculum fails to provide context for the study of economics and business with reference to economic history and key institutions, and neglect of the distinction between microeconomics and macroeconomics, as well as key concepts such as the 'invisible hand' of the price system, specialisation and the gains from trade, important macroeconomic variables, market failure versus government failure, and the role of the financial system are of particular concern. If there is limited scope for including the above material in light of curriculum requirements in other fields of study, it is suggested that the economic history material be alternatively considered as a priority theme within the history curriculum.

In summary, the document is misleading, long, unbalanced and too imprecise to be useful for students, teachers, and parents. As a result, it is ill suited as a basis for developing standards by which students' progress in understanding key economics and business topics can be assessed. In short, the Australian Economics and Business curriculum document fails to achieve its goal of helping students 'develop the knowledge, understanding and skills that will inform students about the economy and encourage them to participate in and contribute to it.'

Fundamental problems with the existing document suggest that it is beyond redrafting. Consequently, we recommend that a fresh curriculum document be written incorporating the most important themes identified in this report. The traditional economics topics included in the Massachusetts curriculum and aspects of the Ontario business curriculum provide a useful starting point for fashioning this new curriculum. While covering mainstream topics, it should however be adapted to highlight unique characteristics of the Australian economy, as well as international institutions and the importance of international trade.

15. Health and Physical Education (Foundation to Year 10) – Professor Chris Hickey

Executive Summary

Based on careful review of the new Australian Curriculum: Health and Physical Education, and benchmarking against other international curricula of like focus, I extend resounding support toward implementation. Rooted in a strength-based approach, the Australian Curriculum distinguishes itself as a document that encourages learners to take an active engagement in their own, and others, health and wellbeing. The rationale and aims that inform the aspirations of this document are based upon sound contemporary and future-orientated propositions. A further distinguishing feature of the Australian Curriculum is its embedded invitation for ‘local context’ to be integrated at all levels. The flexibility that is built into the content descriptions and elaborations positions teachers as professionals who are best placed to make judgments about their learners’ needs and interests. The achievement standards also provide clear direction with respect to student learning outcomes. Unlike previous Health and Physical Education (HPE) curricula, the new Australian Curriculum: Health and Physical Education seeks to work with, rather than for, teachers and learners to determine and develop the knowledge, understanding and skills needed for healthy active citizenship in the 21st century.

While the new Australian Curriculum: Health and Physical Education does not represent a radical reform of what teachers already know and do, it does have the potential to challenge and refurbish some of the long held underpinnings of the field. This can be read as both a strength and a weakness. As a strength, it means that most teachers will read it and recognise many dimensions of what they already do, and therefore be less intimidated or threatened by its change force. As a weakness, there is a concern that the familiarity of key structures and content has the potential to undermine the important fundamental changes that this Australian Curriculum seeks to evoke across the field. At the forefront of this is the re-positioning of young people as active shapers of their own health and physical activity biographies. Rejecting depreciatory views of young people as being ‘at risk’, the new Australian Curriculum: Health and Physical Education looks to provide them with the personal and intellectual resources needed for a (critical) life-long engagement in the practices of healthy and physically active citizenship.

Given the central role that teachers will play in determining the success of the new Australian Health and Physical Education Curriculum it is crucial that they are provided appropriate support, resource and advocacy tools. Ultimately, the successful implementation of this Australian Curriculum will not be measured in the goals and aspirations it espouses but in the values, understandings and actions of the learners it seeks to ‘educate’. To this end, the success of this Australian Curriculum rests not only with the writers, but with those responsible for chartering its implementation.

Comprehensiveness, Structure and Sequence

The structure of the new Australian Curriculum: Health and Physical Education provides a clear sequential framework to guide teachers in the provision of developmental learning opportunities. The key organising structure involves learning in two strands. The knowledge embedded in these

structures are further broken down into six sub-strands (three in each strand), which then cascade down into focus areas, content descriptions and elaborations. There is a clear logic and synergy in the extrapolation of the strands into the actions or verbs that bring learning to life in the elaborations. The title descriptors used to frame the content of the strands and sub-strands provide the recurring signage for presenting the content throughout the document. The consistency of this framework makes the structure of the Australian Curriculum easy to follow and engage. Further to this, the developmental sequencing of learning opportunities is clear, and coherent with the learning outcomes detailed in the achievement standards for each band.

The two strands (Personal, Social and Community Health and Movement and Physical Activity) provide key organising frames for the conceptual and practical learning goals of the curriculum. While they contain somewhat distinct dimensions of the learning provided through this curriculum (namely conceptual and practical) they are designed to be integrated across all phases of the learning continuum (Foundation to Year 10). My concern here is that long-held distinctions between the sub-disciplines of Health and Physical Education might be rehearsed across the two strands. This distinction finds its practical expression in schools with Health as a subject taught in the classroom and Physical Education taking place outside or in the gymnasium. Within the relatively short modern history of curriculum integration between Health and Physical Education there exist relatively few exemplars of genuine and sustained assimilation between these two sub-disciplines. In supposing their organic integration this curriculum seeks to achieve what those before it have not been able to. To this end, this curriculum will require substantial resource in the implementation phase.

Beneath the two organising strands, the six sub-strands are the most recognisable layer of the cascading structure that frame the curriculum. Indeed, the six sub-strands are the content organisers across all developmental levels of the curriculum. Beneath the sub-strands are twelve focus areas that contain the key knowledge, understanding and skills that seeks to be developed through the curriculum. They take the content of the sub-strands and break them down into content specific areas that can be mapped into the breadth of learning experiences from F-10. It is the 'verbs' that are built up around these focus areas that shape the sequential learning and development that is to be delivered across the progress of this curriculum. The focus areas not only ensure a breadth of learning content, but their careful selection allows for deep learning to also occur. While particular focus strands need to be amplified at different developmental stages across F-10, there is a case for them existing in some form across all levels. For example, I can't see any strong reason why 'Challenge and adventure activities', 'Games and sports' and 'Lifelong physical activities', are not deemed relevant to learners between Foundation to Year 2, albeit in an introductory way.

The learning continuum is broken up into three developmental band levels (namely Foundation to Year 2; Years 3 to 6, Years 7 to 10). The rationale underpinning the establishment of these bands is sound. At their core is a recognition of the varying personal and social developmental needs that each of these phases gives primacy to. In practical terms the bands do not form hard boundaries around developmental needs of learners but rather signal core shifts in curriculum focus. In their simplest form the band levels mark key shifts in focus from understanding and caring for the self (Foundation to Year 2), to understanding and communicating with others (Years 3 to 6), and to the understanding and engaging with the social world (Years 7 to 10) - though there are dimensions of

each of these at all band levels. Of some concern is the fact that, while these band levels are presented as coherent developmental stages, the content is presented differently in the body of the curriculum. In the body of the curriculum, all developmental levels are presented across two-year spans (Years 1 and 2; Years 3 and 4; Years 5 and 6; Years 7 and 8 and 9 and 10) except for Foundation. While I have no problem with the logic of this developmental sequencing, more overt connection to their positioning within the over-arching band levels would be valuable. I also note that the developmental couplings separate conveniently between Primary and Secondary schooling, therefore allowing for their ongoing systemic separation. It remains a challenge for teachers to establish communication patterns to ensure that transition between band levels 2 and 3 is aided by shared teacher understandings and expectations. Without this the curriculum runs the risk of being separated according to its Primary (Bands 1 and 2) and Secondary (Band 3) components.

The key knowledge, understanding and skills assigned to each developmental stage are presented as content descriptions within the three sub-strands that comprise each strand. Within the HPE curriculum there are a total of 108 content description statements, each of these has an individual code for further reference and reporting. The content descriptions are not prescriptive but rather provide the learning road map to age appropriate sequential learning. Within each of the 108 content descriptions are a series of content elaborations that provide 'active' learning prompts to advance the particular knowledge, understandings and/or skills that are being foregrounded. Initiated through a verb (eg identify, create, recognise, demonstrate, compare and so on) the content elaborations are key prompts for teachers who might otherwise ask 'what am I supposed to do?' Though these are presented in a non-prescriptive way, and can be used selectively by teachers, they form a critical link in the transfer from curriculum to practice.

Methodology to embed cross-curriculum priorities

The introduction of a strength-based approach marks a significant change in the ways that health and wellbeing have been approached in recent Australian Health and Physical Education curricula. While the content is largely consistent with the suite of state-based curricula that it looks to replace, it marks a fundamental shift in the philosophical framework within which it is delivered. Here, the emphasis shifts from a deficit view of 'youth at risk' and harm minimisation, to a focus on the positive contribution that individuals can make to their own health and wellbeing. Within this framework the Australian Curriculum: Health and Physical Education invites young people to become active agents in shaping their own health biographies. Importantly, the strength-based approach recognises the limits of personal agency and acknowledges the ways that class, culture, family, gender, community and other personal issues can limit and constrain the health and wellbeing 'choices' of individuals.

The cross-curriculum priorities of Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia and sustainability are absorbed organically into the strength-based model. Within this framework the cross-curriculum priorities are referred to throughout the content descriptions offered across the developmental stages of the curriculum. As such they are presented as particular foci that can advance and extend the broad learning goals. It is here that the electronic design of the curriculum value-adds the sequenced learning framework that is presented. Here, the cross-curriculum priorities are presented as icons within the content descriptions. By

selecting these Icons, teachers can access concepts and ideas about how to integrate the cross-curriculum priorities into the curriculum content. Some concern remains as to how well teachers will use the icons or whether they will be so consumed with the 'explicit' layers of the Curriculum that the cross-curriculum priorities get lost or overlooked.

More direct connections to the cross-curriculum priorities can be identified within the content elaborations. At this level, recurring reference is made to developing knowledge, understandings and skills related to these learning priorities. As with all other learning foci, the specific content elaborations that address the cross-curriculum priorities are ultimately at the determination of teachers to interpret and enact. Further compromising the uptake of the cross-curriculum priorities is the relatively little recognition they receive in the achievement standard statements that are provided at the completion of each developmental stage. Given the propensity for teachers to be motivated/driven by that which is reportable, it would be strategically valuable if there were more explicit expectations forged to addressing the cross-curriculum priorities.

Flexibility for effective implementation

A considerable strength of the Australian Curriculum: Health and Physical Education is its strategic methodological intention to engage with real teachers and learners in real schools. While the Curriculum is decisive in naming the knowledge, understandings and skills that young people should develop across the developmental levels between Foundation and Year 10, their sequential development is set within a flexible design that recognises the 'centrality of context' in the pursuit of effective teaching and learning. Recognising that the provision of health and physical education as a curriculum practice in Australia schools encompasses a myriad of complex and diverse settings, the curriculum frames learning as an active and negotiated process. At the heart of this is an embedded invitation for teachers and learners to filter the meaningfulness of the curriculum content through the lenses of context and experience.

Acknowledging the limitations of any curriculum to accommodate the array of individual learner needs and learning contexts it seeks to assert influence over, the Australian Curriculum: Health and Physical Education is overt in shifting this dimension of the pedagogic process to teachers. In practical terms, the curriculum recognises that there are a variety of learning experiences available to teachers to facilitate the content goals. To this end, the content descriptions are largely written as learning value-statements that teachers can achieve through a wide range of means. Embedded in this is a recognition that teachers are best placed to accommodate learner differences and how their different backgrounds, abilities and experiences will shape the learning environment. The content descriptions and elaborations are presented in a way that strategically invites teachers to transpose the learning aspirations into their local contexts so as to enhance their currency and relevance amongst learners. To further facilitate this, the achievement standards are not presented as bounded or absolute learning outcomes, but rather as learning propositions that can be addressed within any context. While this is a laudable feature of the curriculum it is not unproblematic. Teachers are likely to require extensive professional development and resourcing to successfully negotiate this feature of the curriculum.

To this end, the Australian Curriculum: Health and Physical Education positions teachers as professionals who possess the necessary expertise to make informed decisions about the effective delivery of its' content. More-so than in antecedent health and physical education curricula, teachers are expected to play an active role in interpreting and translating the content goals into their own classrooms, gymnasiums and playing fields. The success to which this lives out in practice rests in the how successful the curriculum writers have been in accommodating the somewhat competing tensions of direction and flexibility. In striking this balance, the curriculum looks to arm teachers with a clear future-orientated learning blue-print around which there are multiple points of entry and connection.

Fostering learning and skill development

The Australian Curriculum: Health and Physical Education provides a comprehensive and coherent framework for guiding learning in this increasingly important area of the school curriculum. Forefront in its programmatic sequencing is an intention to develop knowledge, skills and understandings for healthy and active citizens of the 21st century. Recognising that the first graduates to complete this curriculum will emerge in 2026, the curriculum has a flexible future-orientation that accommodates both the contingent and contextual. Rather than attempt to prescribe the learning that might be deemed necessary for a successful engagement in the future, the Australian Curriculum: Health and Physical Education invites teachers and learners to play an active role in shaping the learning process.

The blending together of the historically discrete sub-disciplines of health and physical education forges a diverse discipline content that is difficult to fully represent. While the Australian Curriculum: Health and Physical Education does a commendable job of defining and framing key skills, knowledge and understandings that underpin this learning domain, these are not without contestation. At the centre of contestation is the ongoing struggle to blend the biophysical and socio-cultural dimensions of this learning area. At its most basic level, this distinction is played out in schools between the indoor (health education) and outdoor (physical education) dimensions of the learning assigned through this area of curriculum. While the Australian Curriculum: Health and Physical Education seeks to integrate the learning and skills on offer through their collective representation, it runs a considerable risk of failing to achieve this. Of primary concern here is the dual strand structure of *Personal, social and community health* and *Movement and physical activity*, that can be (mis)interpreted as reinforcing historical distinctions between health and physical education.

The Australian Curriculum: Health and Physical Education makes deliberate and strategic steps to maximise the learning potentiality of this subject domain by integrating its learning through a range of 'general' and 'cross-curriculum' priorities. Within this undertaking the curriculum engages with issues of learner and discipline diversity. Prominent here is a recognition of the myriad different cultures, capabilities (disabilities) and sexual identities that comprise contemporary society. Taking on a strength-based approach to dealing with difference and diversity, the Curriculum invites learners to explore the ways that heightened social inclusion can expand, rather than constrain, learning, skills and understanding. Supporting this is an overarching commitment to nurture critical inquiry, wherein learners are encouraged to question social strata's that serve to marginalise some

groups while privileging others. While the Curriculum is explicit in the pursuit of integrated learning, it runs the risk of taking on more than it can realistically deliver on.

On balance, I believe that the new Australian Curriculum: Health and Physical Education represents a moment of enormous opportunity to define, direct and invigorate learning in this important dimension of the school curriculum. Through its expansive and integrated learning framework it provides a learning scaffold to provide future school leavers with the knowledge, skills and understandings for conscience participation in the promotion of a healthy and active society, and citizenship. The challenge that confronts this Curriculum lies in the translation from text to practice. While the non-prescriptive, flexible design of the Curriculum is a feature of its commitment to accommodating the contextual and contingent, it places considerable responsibility on teachers and their ability and aptitude to translate the learning goals into purposeful and sequential learning practices. Considerable support, resource and direction are going to be needed, at both in-service and pre-service levels, to ensure that this is not left to chance!

Key Recommendations

- There is a need for the provision of curriculum and pedagogic resources to support teachers in translation of the Australian HPE Curriculum from text to practice.
- Exemplars of effective translation from text to practice are compiled in a collection of case studies (units of work) and disseminated to teachers.
- A coordinated and systematic program of teacher in-service is made available to teachers, with appropriate resourcing to facilitate their active engagement.
- A clear strategy for engagement with the Australian HPE Curriculum is developed for implementation in pre-service teacher education programs (for both specialist and generalist teachers).
- Strong 'political' support for the new Australian HPE Curriculum is needed at the highest level of Government, therefore providing leverage for the provision of curriculum resources (time and material) at the local level.
- Micro-political support (from principals and other local leaders) needs to be given to teachers in schools charged with the delivery of the new Australian HPE Curriculum – including built in accountability and/or funding incentives to recognise associated efforts and achievements.
- There is a need for coherent reporting strategies for monitoring and mapping student learning against the achievement standards established in the Australian HPE Curriculum.
- Designated 'champions' should be established in all schools, charged with (and resourced to) fostering the implementation of the Australian HPE Curriculum and disseminating up-to-date strategies and resources.

Benchmarking Statements

The following two international comparisons were selected on the basis of their curriculum connections between the sub-disciplines of health and physical education. In a number of other contexts these two subject areas are not united in the same curriculum domain. The UK, for example, brings Physical Education together with Sport in its National Curriculum. Such couplings

were not selected for benchmarking on the basis that their underpinning philosophies and assumptions are not aligned to the Australian Curriculum: Health and Physical Education.

The Health Education Syllabus of Singapore identifies three fundamental dimensions of learning in this sphere of the curriculum. These are represented as Physical Health; Emotional and Psychological Health; and Environment and Your Health. In a similar cascading framework as the Australian Health and Physical Education Curriculum, the Singapore Health Education Curriculum has a series of Themes that organise the content. To this end, their organising structures, and recurring menu prompts, have many similarities. Beneath this, the major points of difference are in the ways that the Australian Curriculum: Health and Physical Education engages with context - whereas the Singapore Health Education Curriculum is much more content focused wherein teachers are the delivers. I believe that the way that the Australian Curriculum engages with teachers, as active in shaping the learning experience, is a significant strength.

While there is some overlap in their content, these two curricula vary quite significantly in their fundamental learning philosophies. Whereas the Australian Curriculum: Health and Physical Education is orientated toward empowering learners through the advance of student values and attitudes, the Singapore Health Education Curriculum is much more orientated to shaping behaviour and creating healthy disciplined citizens. Neither of these orientations is necessarily right or wrong, but rather they are informed by cultural practices and expectations. I believe both are appropriate to their particular cultural contexts and while they can learn from each other, the strength-based approach of the Australian Curriculum is both philosophically sound and culturally appropriate.

The final point of difference that I believe emerges from the comparison of these two national curriculums exists in their respective positioning of learning through the physical. Quite simply, there is a far greater importance given to the physical education dimension of this subject domain in the Australian Curriculum. Within the Australian context, there is a far greater expectation that students will participate in a variety of forms of physical activity, be it games, fundamental movement, recreation or adventure activities, or sport. While both curricula espouse the pursuit of a life-long engagement with physical activity, the Australian Health and Physical Education Curriculum is much better positioned to achieve this goal.

The New Zealand Health and Physical Education Curriculum has a number of similarities with its Australian counterpart. After its initial launch in 1999, it has gone through a number of reviews, the last being 2007. Like the Australian Curriculum, the New Zealand Curriculum looks to achieve its key learning goals through the integration of Health and Physical Education. Whereas the Australian Curriculum: Health and Physical Education has two major strands, the New Zealand Curriculum has four. While the content and aspiration of both national curricula is quite complimentary, the Australian Curriculum provides a simpler and clearer model for presenting and connecting its content. I believe this will be a considerable advantage when looking to engage teachers in its uptake and implementation.

A further point of difference between these two national curricula is their engagement with their 'Indigenous' cultures. Recognising that the Maori and Pacific Islander presence is a much greater proportion of its overall population, the New Zealand Curriculum has a substantially stronger bi-

cultural presence. Indeed, Maori philosophy of wellbeing (Hauora) is an underlying value of the curriculum. Beneath this, many components of the learning and practice presented in the content of the curriculum are directly related to Maori and Pacific Islander values. While the Indigenous dimension of the Australian Curriculum is not likely to command the same profile, there is much to leverage from the New Zealand Curriculum in the respectful inclusion of Indigenous cultural values.

16. Appendix 1 – Scoping Brief

Background

The Australian Government has commissioned a Review of the Australian Curriculum to evaluate its robustness, independence and balance and examine the content and development process. The Terms of Reference of the Review are attached.

A central element of the work of the Review is an analysis of the curriculum documentation for the following learning areas:

- | | |
|--|---|
| ▪ English (Foundation to Year 12) | ▪ Mathematics (Foundation to Year 12) |
| ▪ Science (Foundation to Year 12) | ▪ History (Foundation to Year 12) |
| ▪ Geography (Foundation to Year 12) | ▪ The arts (Foundation to Year 10) |
| ▪ Technologies (Foundation to Year 10) | ▪ Civics and Citizenship (Year 3 to Year 10) |
| ▪ Economics and business (Year 5 to Year 10) | ▪ Health and Physical Education (Foundation to Year 10) |

The focus in this element of the Review using the expertise of subject matter specialists will be largely on the content related aspects of the curriculum. However the Reviewers are aware of the differences between an intended and a delivered curriculum, the need for flexibility in learning approaches to achieve learning outcomes, the variations which occur in pedagogy, and the differing nature of the context of each jurisdiction, sector, and schools in their classroom practices and time allocation. It can be taken that these aspects are understood and will not be overlooked in the course of the Review.

In conducting the curriculum analysis and benchmarking aspect of the Review, subject matter specialists will focus on the content specified in the Australian Curriculum, notably the knowledge, understanding and skills component, with a particular emphasis on its comprehensiveness, structure and sequencing.

Essentially the Reviewers are seeking to assess:

- whether the Australian Curriculum represents what Australian students should be taught in schools
- how the intended Australian curriculum in each subject area compares with that of high performing countries and those facing similar challenges
- whether the Australian curriculum reflects what evidence based research suggests is a sound, rigorous and balanced curriculum.

The key criteria for appraisal of this content, knowledge, and skills are:

- robustness – interpreted as including a foundation in aims values and principles, academic rigour and relevance
- balance – interpreted as comprehensive inclusion of key core and basic concepts facts and themes without bias as to selectiveness of content and emphasis, and
- scope for choice and flexibility in delivery.

The extent to which the specified general capabilities and achievement standards are related to curriculum content is also of particular interest. As there have been three cross-curriculum priorities endorsed by governments, the Review is also interested in an assessment of how these have been addressed, including the appropriateness and necessity of embedding them across all learning areas, as well as identifying any alternative methodology which might have been used.

Scoping brief

- A. Subject matter Specialists will provide an analysis and evaluation of the following factors across the whole learning area being reviewed:
 1. the content of the learning area, as specified in the subject's content descriptions and content elaborations, particularly relating to its:
 - robustness (defined as academic rigour, structure and sequencing, detail, clarity, succinctness and evidence of a foundation of aims, values, and principles)
 - balance (including a comprehensive inclusion of key core and basic knowledge facts, concepts and themes, without bias as to selectiveness of content and emphasis), and
 - scope for choice and flexibility in curriculum delivery without undue encouragement of the adoption of ephemeral or other practices which are not evidence based.
 2. the soundness of the general capabilities and achievement standards in terms of the extent to which they have been linked to curriculum content in this learning area.
 3. the appropriateness and relevance of the methodology to embed the three cross-curriculum priorities across this learning area, and whether there are alternative approaches which could have been developed to introduce these themes.
 4. the extent to which the core content in this learning area allows flexibility in classroom delivery for different school contexts and different stages of schooling.
 5. any significant treatment in the Australian Curriculum documents for this learning area of related issues such as explicit and implicit assessment, pedagogical and epistemological characteristics.
 6. whether the curriculum documentation in this learning area is friendly for students, teachers, and parents, and for development of accountability and reporting measures which will lead to effective school community engagement.
 7. whether the curriculum for this learning area encourages a love of learning, a joy of discovery, and a quest for knowledge and related skills.
- B. Using four or five key content areas, skills, and/or topics considered essential in terms of the subject being evaluated, subject matter specialists will also assess how the Australian Curriculum for this learning area compares with the curriculum of two other relevant countries, focussing on their approach to the inclusion and design of key learning content, core knowledge and accompanying rationales (the four to five key content areas etc and the countries to be chosen will be determined following consultation between the subject matter specialist and the Reviewers and documentation will be provided).