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Digital Technology Education and its Impact on Traditional Academic Roles and Practice

Abstract
This paper explores the interface between digital technologies and the teaching labour process in Australian higher education. We develop an adaptation of the seminal Clark (1983, 1994, 2001) and Kozma (1991, 1994) debate about whether technology merely delivers educational content unchanged – technology as the 'delivery truck' – or whether education is changed as a result of using different technologies – education as 'groceries'. Our adaptation is an extension of this metaphor to include the academic teacher as the driver of the grocery truck. With the implementation of new educational technologies, the human resource management aspects of job design, motivation, skilling and work identity are often overlooked, with critical debate about the impact on the teaching labour process seldom considered. In this argument, we will unpack the Clark-Kozma dichotomy of the education/technology interface by looking beyond the embedding of Information and Communication Technologies (ICT) in Australian higher education to examine more broadly the changes to the traditional academic role as the creator, developer and delivery agent of the educational groceries. This has been reinforced by the marketisation of the sector and the concomitant reconfiguration of the traditional teaching process. All this has led to changes in the sense of work identity for academics (McShane, 2006). While we embrace ICT as a potential benefit for both students and academic teachers, we seek to ensure that the 'truck driver's' evolving role is acknowledged in scholarly debates and included in models of learning and teaching if long-term sustainable work practices are to be achieved. One such model is offered.

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Introduction

While there is contention about framing changes to the teaching labour process in the performative discourse of management (Barnett and Coate, 2005) there is nevertheless a need to acknowledge and respond to the significant impact of ICT on the actual tasks of teaching – the labour process (Smith, Ling and Hill, 2006; Snyder, Marginson and Lewis, 2007). Currently in many Australian universities there is a rarely challenged assumption that digital technologies offer 'win-win' to institution and student alike, and that the academic is neutral in the process. As an industrial sociologist and an educational designer we blend data from two theses, empirically based, one in the industrial sociology of Australian higher education and the impact of flexible delivery on teaching (Sappey, 2006), and the other in education design and l(IT)eracy practices of academics writing online (Relf, 2007). We also draw on a work journal of our initial engagement with online teaching, and we reflect upon the impact of digital technologies on the role and identity of teaching academics.

Our focus is the seminal debate between Clark (1983, 1994, 2001; Clark & Salomon, 1986) and Kozma (1991, 1994) in the early 1980s and throughout the 1990s, on the role of instructional technology and media in learning and performance. It still lies at the heart of the development and adoption of new educational technologies today. Although not definitively resolved one way or the other, the proposition that media do or do not influence learning has been embedded in much of the development of digital technology education (Olusakin, 2008; Bassili and Joordens, 2008; Kong and So, 2008; Bassili, 2008; Robert and Lenz, 2008). Using a metaphor of education as groceries and the grocery truck as the delivery technology, Clark's position was "that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition. Basically, the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle can influence achievement" (Clark 1983, p.446). Kozma (1991, p.179) strongly refuted Clark's position, arguing that particular forms of media have particular affordances and learning benefits which should influence the choice and use of pedagogy.

In 2010, the debate retains its significance as the platform for evaluation of the impact of ICT in education. In US educational debates, explicit reference is made to the Clark-Kozma debate. It is Bassili's (2008) starting point for an assessment of student choices to attend lectures or watch them online. It is the starting point for Robert and Lenz's (2008) assessment that e-learning technologies have become sufficiently stable to now allow the focus to shift to

instructional quality and content rather than the technology itself. It is also the bases of definitions of blended learning reflecting the Clark/Kozma debate about the influence of media versus method of learning (Graham, 2006). In Australia and the UK the focus of education debates has moved to cognitive mediation models and to student learning, however these are based in the technology/pedagogy dichotomy (Goodyear and Ellis, 2008; Snyder, Marginson and Lewis, 2007; Lea, 2007; Smith, Ling and Hill, 2006.)

As Australian universities position themselves in response to the digital learning environment through blended learning, flexible learning and e-learning, which will be discussed below, it is worthwhile returning to the Cark-Kozma debate which Graham (2006) described as reflecting the bases of models of blended learning. The significance of the debate for this paper is that irrespective of whether pedagogy drives technology or vice versa "it is what the teacher does – the teaching – that influences learning" (Clark 1983, p.453). This is recognition, albeit limited by Clark, of the role of the delivery truck driver, that is, the academic teacher in the learning process and that it is the quality of teaching that confers the main benefits for learners (Laurillard 2007, p.39). The significance also lies in the fact that pedagogical writing, like any writing, has always involved a technology (Green, 1993, pp.19-21). Thus pedagogy has never been independent of a technology, but has been formed through the affordances - potentials and limitations - of the technologies used (Relf, 2007; Jones and Relf, 2004). However, the groceries do not get delivered without the driver, irrespective of the delivery technology. And yet, throughout much of the educational literature academic labour is assumed to be neutral in the process, with issues of skill development, work intensity and pace, and motivation overlooked (Smith, Ling and Hill, 2006). While it is implicit in the debate and the literature on ICT and university teaching that student motivation and performance are enhanced by media (Kirkwood and Price, 2005) there is growing evidence of a critical perspective regarding the changing nature of the teaching process and academic performance as they are affected by motivation, resourcing and workloads linked to ICT adoption (Kirkwood and Price, 2008; Snyder, Marginson and Lewis, 2007; McShane, 2006; Smith, Ling and Hill, 2006). We argue that to achieve an enriched learning environment, the metaphor of the 'delivery truck driver' and the realities of academic teaching need to be reinstated in the learning and teaching debate. Without academic teachers' passion for, and enjoyment of what they are doing, there can be no excellence in teaching or learning.

Discussion

In a critical review of blended learning, Oliver and Tigwell (2005) describe twelve definitions ranging from a blend of media to a blend of pedagogy,

which Graham (2006) described as a positioning of the Clark - Kozma debate. Blending media has been influenced by statements such as Laurillard's description of media in terms of their pedagogical position within her conversational framework pedagogy (cited in Oliver and Tigwell, 2005, p.19), while blending pedagogies proposes combining constructivism, behaviourism and cognitivism to optimise learning outcomes (Oliver and Tigwell, 2005, p.18). Stacey and Gerbic's (2009) review of blended learning describes the predominant combination of face-to-face and online learning. Macdonald (2006) provides a brief description of blended learning across a face-to-face and distance cohort that would account for the practice in our institution that we call 'Tutorial Mode' in which on-campus students receive the distance education materials and have only face-to-face tutorial contact with academic staff. However, in this model the enrolment cohorts are taught separately and frequently by different academics. Our application of blended learning, from which we have developed our delivery truck driver model of blended learning, is more radical in which the on-campus and distance education students together form one class receiving the same enriched learning environment (pedagogy). The rhetoric of pedagogical benefits and efficiencies belie the complexity of institutional politics in adopting blended, flexible and e-learning (Snyder, Marginson and Lewis, 2007; Smith, Ling and Hill, 2006, p.78; Lea, 2007) and is unsupported by research into student learning practices (Masterman and Vogel, 2007, p.58; Oliver and Tigwell, 2005; Goodyear and Ellis, 2008) and the need for academic training in writing in the new technologies (Kanuka, Heller and Jugdev, 2008). This problematises the choice about where, when and/or how they learn (Taylor, Lopez, Quadrelli 1996). The difficulty lies in the definition of the issue at the intersection of learners' needs with academic lecturers' job design. This has been an historical as well as contemporary area of contention (Nunan, 1983; McShane, 2006) and is perceived differently by management and academics (Smith, Ling and Hill, 2006). Snyder, Marginson and Lewis describe the difference as belonging to different paradigms: e-constructivism as a pedagogical paradigm engaged in by academic teaching staff and the e-corporate paradigm which focuses on 'the potential of ICTs ... to bring higher education to a larger student population, while reducing per capita costs' (2007, p.189). Secondly, blended learning implements a client focused strategy to make learning at university more convenient and accessible to students, with the potential to open new markets (a business strategy and marketing tool). Blended learning is therefore now a market position with concomitant performance indicators which are critical to a university's position in the global higher education marketplace and which cascade down from the institutional level to individual performance management targets in the use of the new ICT (Sappey, 2006). The implementation of pedagogical and technological reforms in many Australian universities demonstrates not only confusion about the vision of the institution and internal political contestation as Smith, Ling and Hill (2006, pp.69) argue, but a different orientation created by conflicting paradigms of

education and marketisation (Snyder, Marginson and Lewis, 2007). Thirdly, blended learning is operationalised through restructuring time and place (Taylor, Lopez and Quadrelli, 1996), and the concomitant reconfiguration of the traditional patterns of academic work (teaching labour process). Traditionally the rhetoric for change has been based on external factors such as student needs and government policies. Smith, Ling and Hill (2006) however, illustrate in their study of the implementation of flexible learning, that the significant influences were 'internal factors including the interest of powerful individuals and groups' (2006, p.78). As an issue of the teaching labour process, their study also provides evidence that 'none ... set out to manage the change focus in a way that significantly addressed the concerns of these (academic staff) stakeholders' (p.78, *parentheses added*). Flexible delivery provides a means of replacing labour (ongoing costs) with ICT technology (variable plant costs) (Cunningham et al, 1998) through the redesign of the teaching process. In that blended learning significantly changes the traditional academic tasks to be done, how they are to be done and alters the control of parties involved in those processes, it can therefore be construed that as a form of flexible delivery, blended learning is a new, particular form of work organisation for teaching academics. The convergence of all these facets leads us to define blended learning as pedagogy, a business strategy and marketing tool, and a teaching labour process (Sappey, 2005). Although blended learning means different things to different stakeholders in higher education, it is this last dimension, the academic as the ‘truck driver’ and the need to acknowledge the active not passive role of the academic teacher in blended learning and the use of ICT, which is the focus of this article.

The implication of taking such a focus is to restore balance between the teaching labour process and the now dominant student learning focus which has been the discourse for improving university teaching for the last twenty-five years and at the centre of teaching and learning agendas and policy. Operating within the e-corporate paradigm which articulates values of academic capitalism as universities are positioning themselves in a global marketplace (Snyder, Marginson and Lewis, 2007; Slaughter and Leslie, 1997; Lafferty and Fleming, 2000), the student learning focus has de-centred university teaching through discourses of the student-as-customer (Sappey, 2007), the student-as-flexible-learner and institutional commitment to improving student learning through ICT. McShane (2006, pp.32-37) identifies that while rarely articulated, there is an implicit assumption that a teacher’s teaching will improve (both in quality and in moral fundamentals) if adopting the student learning perspective. And yet, staff assistance to adopt new technological and pedagogical practices has been less than adequate. Smith, Ling and Hill illustrate how one institution dismissed such assistance because the new 'on-line developments (were) an extension of (the old) flexible delivery rather than an entirely new initiative' (2006, p.78). Kanuka, Heller and Jugdev (2008) found that academic staff identification for professional

development, were pedagogical practices restructured through the affordances of on-line technologies. Laurillard (2008, p.25) recommended that staff needed to experience the technology as students did. We maintain that a more concrete approach than enculturation is needed, in keeping with the principles of human resource management. Improved performance with the new ICT requires a stronger focus to be placed on capacity building at the teaching faculty level through training embodied in the academic identity: discipline and pedagogic practices further refined by institutional cultures (Snyder, Marginson and Lewis, 2007) including the impact of change on workloads, job design, motivation and work identity. In the ongoing Clark and Kozma debate about the relationship between ICT and pedagogy, and in the creation of new learning and teaching environments, due consideration needs to be paid in equal measure to human capital, pedagogy and technology.

In the enterprise university in Australian higher education, there is now a struggle over the pace of work and the workload (work intensification), the nature by which work is organised and managed (job design and work organisation), and the production process itself (educational design and delivery) (Meek and Wood, 1997). It is acknowledged that flexible delivery modes utilizing ICT increase academic workloads, particularly in the development phase (Samarawickrema and Stacey 2007, p.33). Academic workload often involves developing learning resources without adequate lead time, maintaining communication through what Brabazon (2002) refers to as the 'digital hemlock' of email and discussion boards, adopting new work practices in response to the demands of the technology and learning the myriad of new technology software applications. Flexible delivery utilizing ICT also brings in other technical and professional staff because of the need for expertise and curriculum design, thereby removing the sole responsibility for curriculum development from teaching academics. In particular it diminishes control by academics over the teaching process. In a literacy analysis of the e-learning agenda in UK universities, Lea (2007) identifies the fixation on pedagogy and digital technologies at the expense of the 'what' of education, namely disciplinary knowledge. Academic isolation in the e-learning discourse, Lea concludes, results from notions of learning 'being decoupled from any notion of individual student engagement with subject and disciplinary bodies of knowledge' (2007, p.22). Snyder, Marginson and Lewis (2007, p.199) similarly found that when the ICT innovation was "discipline-based" and dominated by educational rather than e-corporate objectives, innovation was more successful. While this may be seen as desirable (Snyder, Marginson and Lewis, 2007; Coaldrake and Stedman, 1999) at the very least it should be acknowledged that it has meant a fundamental change to the instructional paradigm (Smith, Ling and Hill, 2006), something which has the potential to fragment academic functions, status and autonomy (Cunningham et al 1998, p.6) through the use of a language that focuses on student learning

devoid of subject and disciplinary 'ways of knowing' (Lea, 2007, pp.17 and 18). The academic teacher is noticeably absent in such a paradigm.

The organisation of academic work in blended learning assumes a production, input/output focus in which academics adopt the role of content experts/learning facilitators in a multi-disciplinary project team. Even within Oliver and Tigwell's reconstruction of blended learning as a student centred variation theory, the technology is situated as Clark did, as the carrier of meaning: '(b)lends of e-learning with other media' (2005, p.23). This version of the Clark-Kozma debate still assumes the invisibility of the academic. In the e-learning and quality assurance phase of contemporary education production, academic work is external, deskilled and academic identity is fragmented (McShane, 2006). This juxtaposes, sadly and ironically with the impact of digital technologies in other industries. For example, the printing and film industries promote a natural convergence of skills and tasks, however, within the education industries the trend seems to be in the opposite direction (Kress & van Leeuwen, 2001). The creation of 'product' and the emphasis on the 'performativity of knowledge' (Usher *et al*, 1997) (bringing direct benefit to the end-user) have triggered the demise of an holistic model traditionally found in Australian universities in which the academic's role was one of creating expert pedagogic content, development and delivery. The teaching academic is now part of a multi-disciplinary project team. This places teaching academics within a broader range of discourses (Kress and van Leeuwen, 2001) with the tendency to overwhelm, if not ignore disciplinary knowledge (Lea, 2007). Some of the discourses are: quality assurance and quality compliance (Smith, Ling and Hill, 2006); technology and learning (Lea, 2007); e-constructives and e-corporate (Snyder, Marginson and Lewis, 2007) which measure university teaching as adjudged by student performance indicators and customer satisfaction surveys. Because ICT is the dominant discourse, it is being used to facilitate this through its delivery capacity and parallel monitoring and surveillance functions (Kitto, 2003).

This is a substantial shift from the traditional role of the teaching academic. As identified by McShane (2006, p.7) this shift poses significant dilemmas for teaching academics as lecturers' identities are torn between their perception of themselves as a mentor of students, as a university employee who is increasingly held accountable for measurable performance outcomes, and their own sense of what it is to be a university teacher. For many academics, teaching is not just something they 'do' for a living, but it is in fact who they 'are'. That is to say, teaching is not just a source of income but is central to people's identities.

In the context of 21st century industrial capitalism and its emphasis on flexibility, work identity becomes a significant personal narrative in our lives which defines who we are, what we do, and how we behave, particularly in the

face of continuous change. Work identity is a work-based self-concept sourced in one's occupation and in one's commitment to one's profession. It shapes the roles a person adopts and the corresponding ways in which he or she behaves (Brown *et al,* 2007; Watson 2008, pp.251-258; Walsh 2008, p.46). It is an essential prerequisite for personal and social advancement and offers professionals, in particular, a higher sense of worth and self-fulfilment. Changes brought about by ICT and its underpinning pedagogies, such as the new role of teacher/facilitator will, of necessity, challenge this sense of self as academic teachers wrestle "philosophically with an array of metaphysical and ethical responses about what it means to be a teacher" (McShane 2006, p.13). Teachers actively engage in this process of reshaping work identity and, as such, should never be considered neutral in the process of ICT and blended learning development, for blended learning as a form of work organisation and teaching experience implies choice, values and interpretations by the teacher. Models of teaching in the production of disciplinary and professional knowledge need to be holistic, incorporating the teacher (our particular focus), the learner, the professions, the discipline, the institution and the technologies.

We have already identified how institutions have excluded the academic stakeholders in decisions about pedagogical/technological change (Smith, Ling and Hill, 2006, p.78) and yet, the complex nature of such change for academic labour includes:

- teaching beliefs and practices and their institutional framings (Kirkwood and Price, 2008, pp.9-11);
- the need to develop skills in ICT which brings both costs and benefits (affordances) (Kanuka, Heller and Jugdev, 2008); and
- the need for resourcing of academic staff to make the change (Samarawickrema and Stacey, 2007; and Smith, Ling and Hill, 2006).

In embracing ICT academic teachers have undertaken new roles and adopted a range of new skills and new work practices (such as working in teams to develop learning resources) which are not found in traditional academic work. As Goodyear and Ellis (2008) suggest, this new skill set includes the ability to build ICT scaffolding for student learning and to promote social interaction and development, while maintaining teaching presence in an online environment. It is a difficult balancing act to ensure that the strong focus on student interaction and peer learning does not result in teaching which is "teacher-less" (Dillenbourg 2008, p.131).

One of the few voices to call for recognition of the impact of flexible modes on the teaching labour process comes from Laurillard (2007) who identifies the need for closer scrutiny of the complex process of educational change

using ICT and a better fit between models of technology enhanced learning and their effects on teachers' time. Laurillard (2007, p.22) acknowledges the need to align teaching models with stakeholder demands, career rewards, funding models, and the drivers of curriculum and assessment requirements. The nexus between teaching and learning is even clearer in her acknowledgement of the labour-intensive work associated with the personalisation of student support which students have come to expect in a marketised university sector. Most universities do not monitor the 'digital hemlock' (Brabazon 2002) of personalised student support in an online environment which comes through the 24/7 conduit of email, discussion boards (chatrooms, Wikis, bloggs, forums) as well as through e-simulations, games and e-portfolios. As Laurillard (2007) and Samarawickrema and Stacey (2007) point out, this is a crucial problem because unless academics are able to understand the relationship between the costs and benefits of the new blended learning approach for their teaching labour process, and we would also add, to their employment conditions, technology adoption rates will be low and the full potential of the new ICT not realised. As stated previously, the strategy of reducing staff time and labour costs through replacement with technology has been a major cost driver in the adoption of ICT in Australian universities and seen as merely a resourcing issue. However, staff time is also significant for the university teacher in terms of working life and work/life balance. It is not just a matter of an academic teacher learning how to deliver personalised learning in a way that is affordable for the institution, but also a matter of quality of working life issues for the academic and their family. The development of new technology enhanced learning models must incorporate long term sustainable work practices.

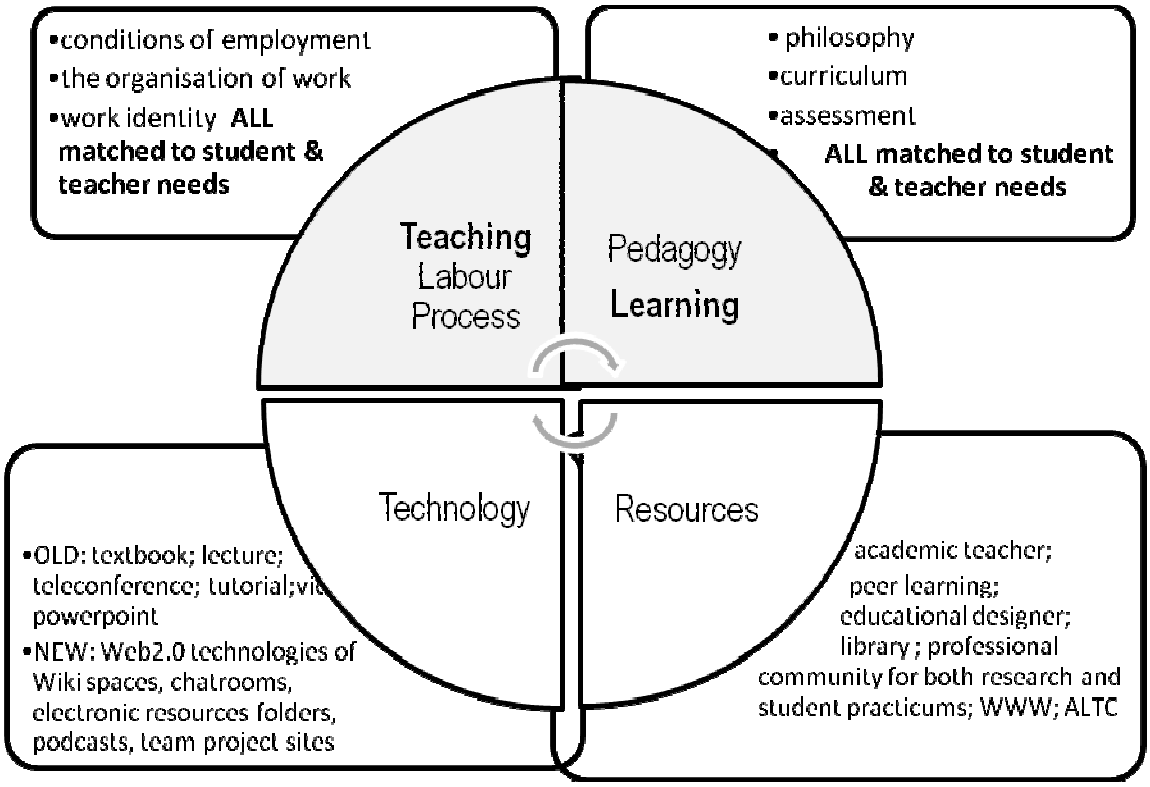
Inclusion of the 'truck driver' in blended learning models

And so this leads us to a model which is derived from our initial design and teaching experiences with blended learning. It is grounded in the Clark and Kozma debate about the relationship between media/technologies (delivery truck) and pedagogy/learning (groceries). However, in keeping with our preceding argument, we include the teacher (delivery truck driver) and their engagement in the teaching labour process, given their significance in blended learning. The model is the combination of, and offers synergies between the teaching labour process and pedagogy.

Our model, depicted in *Figure 1*, is a holistic model of the teaching process implicit in the circle that describes the process. The quadrants of the circle indicate four analytical dimensions that we have found significant in the teaching process. While delineating the process into these four dimensions, it is important to resist the temptation to focus on these separately from the integrated model. The quadrants describe all components of the teaching

process which provide starting or orientations at any one of the quadrants with the caveat that effective design requires all quadrants to be included. Our orientation has us starting from an engagement of teaching and learning and proceeds clockwise to an assessment of the resources available in supporting the academic teacher (teaching), and the student learning, before considering how the technologies enable, restrict and restructure these plans. This is achieved within and influenced by the teaching labour process. Some may start with the teaching labour process with the intention of investing time in the creation of learning materials in order to manage large classes or future career plans and then proceed through all quadrants.

Figure 1: The Delivery Truck Driver in Blended Learning (J Sappey, S Relf and L Ritter 2010)



The teaching labour process is central to an understanding of our modification of Clark and Kozma. We have heard it said at our own university that the use of ICT is only limited by our imaginations. We would disagree. As honourable an occupation as teaching may be with its strong orientation of public service, academic teachers are employees in an employment relationship. Any employment relationship consists of three dimensions: (a) prescribed conditions of employment such as the number of hours in a working week,

wages, and the right to workplace training; (b) work organisation (the tasks to be done, when, by whom and how) which cannot be prescribed because of the diversity of tasks, needs and contexts – work organisation is re-negotiated daily between academic teacher and manager; and (c) work identity, as previously discussed. All of these dimensions of the employment relationship need to be present and in synergy if the needs of the academic teacher are to be met, thus unleashing the full potential of ICT and blended learning. In technology enhanced learning models, the teaching dimension must be a consideration, given that the tasks that the academic teacher sets the learners becomes the tasks that intersect with the teacher's own job design (for example, creation and marking of assessment).

Research has identified that adopting ICT adds additional workload during preparation and requires additional ongoing workload through e-communication and monitoring during delivery (Samarawickrema and Stacey 2007; Brabazon 2002). This impact on workloads needs to be acknowledged and managed. So too, professional development and the development of academic teachers' multi-media literacy need to be an integral part of developing approaches to blended learning. A balance needs to be found between the managerial discourse of skills training to improve effectiveness and efficiency of teachers in higher education and the academic discourse in which the recommended pedagogy was based on the assumptions of collaborative learning (Goodfellow, 2004; Garrison and Anderson, 2000; Weaver, 2003), dialogue (Kanuka, Heller and Jugdev, 2008), conversation theory (Laurillard, 2008) and cognitive dimensions of learning (Vaughan and Garrison, 2005). More recently with the social learning technologies of Web 2.0, principally through tools such as Wiki and blogging, professional development has focused on integrated models of cognitive development with collaboration and dialogue (Laurillard, 2008, Hedberg, 2006; Siemans, 2004; Knobel and Lankshear, 2006). These professional development strategies highlight the significance of the academic teacher in the process as a central stakeholder (Stacey and Gerbic, 2009, p.7, Smith, Ling and Hill, 2006, Laurillard, 2008) acknowledging work identity (Snyder, Marginson and Lewis, 2007). While the common professional development response in the need for teachers 'to be operating as learners' (Laurillard, 2008, p.25), our position is that they need to be treated as academic teachers in the interface between the teaching labour process, pedagogy, technology and resources.

The second dimension of our model is pedagogy. This was chosen to emphasise the design of learning, while at he same time, redressing the historical trend that pedagogy design has subsumed curriculum design (Petrina, 2004; Pinnar, Reynolds, Slattery and Taubman, 2004) and the excesses of e-learning in which the technology and pedagogy are 'being decoupled from any notion of individual student engagement with subject and disciplinary bodies of knowledge' (Lea, 2007, p.22). Pedagogy here is used to

eschew technical rationalism with a focus on creativity and meaning 'as a social-discursive construction... (and) as a form of discourse and critical engagement' (Green, 1990, p.44). We wish to include the role of the delivery truck driver in that discourse. Although in modern educational discourse, teaching and learning are often in tension and even sometimes presented in opposition (Beetham and Sharpe, 2007, p.2), we suggest that the two are synergistic and need to be fully integrated together because the teaching labour process and pedagogy form the learning and teaching environment. What we as teachers ask students to do, is what we ourselves must design, produce and evaluate such that our job design intersects with our students' learning tasks. Irrespective of one's position on whether 'learning' is the central concern of 'learning and teaching', without academic teachers' passion for and enjoyment of what they are doing, there can be no excellence in either teaching or learning (Dillenbourg, 2008, p.131).

As we have shown, the academic stakeholders have been conspicuous by their absence in the decision making for technology implementation in universities (Smith, Ling and Hill, 2006; Laurillard, 2008, p.24). The perception is that technology is, as Laurillard depicts it: 'a solution looking for a problem' (2008, p.8). The focus of resources is not the technical implementation of pedagogy/technology, but re-learning to wr(IT)e and read the educational experience in different technologies that enhance different teaching and learning experiences (Relf, 2007; Jones and Relf, 2004). We include under the banner of resources: opportunities for staff and student training in ICT; student peer support and learning through interactive technologies; collegial peer support and learning; the educational designer and production team; library services; the professional community that provides both academic research and opportunities for student vocational practicum placement; ongoing IT support for teachers and learners; research institutes such as the Australian Learning and Teaching Council which promulgates research into teaching innovation; and the World Wide Web. An awareness of the availability of resources underpins the teaching, the learning and the use by both teacher and student, of the technology.

A textbook has flexibility, portability and interactivity. It is a read-write interactive technology enabling note taking, unless it is a read only library book. The lecture and tutorial rooms are technologies with affordances of delivery and dialogue respectively. The printed study guide, whiteboard and CD ROM technologies have respective affordances of delivery and discourse based on the technical limitations and cultural usage. Laurillard's publications (1993, 2008) have in one sense been applications of her conversational framework refined to enhance the attributes of emerging technological applications. For student learning, the affordances of CD ROM over online access for rural and remote students, reframes the learning experience in a similar way that telephone tutorials did for students in the print based distance

education era. New interactive technologies and generation Web 2.0 technologies offer different affordances: for example, virtual worlds; learning management systems tailored to university-specific needs and incorporating spaces such as Wikis, chatrooms, electronic resources, and project sites; podcasting; and video streaming. The teaching academic does not have to be the expert in the technology, but has to know how to make meaning through it, in other words, to be able to interpret and articulate curriculum through the new technologies.

Our model is a holistic model and to focus exclusively on any one quadrant, or to omit any quadrant, limits the wealth of the model. Working exclusively in the Technology quadrant as the focus for development, potentially marginalises both the teaching process and the learners' needs. It narrows one's perspective on the wealth of resources, other than the technology resources, that are available (Laurillard, 2008). Preoccupation with the technology potentially leads to impoverished learning and teaching. In the application of blended learning in our study, with two separate, internal and distance education, cohorts, we believe we need to start with the teaching and learning quadrant. This is the integration between the teaching labour process and curriculum in its broadest sense. We then move clockwise through consideration of the breadth of resources available, important with increasing student enrolments, to then determine appropriate technologies and tools which are compatible with the teacher's needs, skills and employment conditions (hours, pay, appropriate tasks). Only then can we have a holistic and comprehensive approach to blended learning design which will meet the needs of learners and provide sustainable, long term work practices for teachers.

Conclusion

While the Clark/Kozma framework considered the neutrality or non-neutrality of technology, our concern is the non-neutrality of the academic teacher in digital technology education. Too often labour becomes invisible in the debate with consideration of the role of academic labour being marginalised.

Our approach is to insert into models of curriculum, pedagogy and educational technologies the need to be enlightened by an understanding of the non-neutral role of the teaching academic and the implications for academic work identity and the teaching labour process. Learning and teaching should be considered inseparable and always considered holistically in developing technology enhanced learning models.

Therefore, our model for blended learning extends the Clark and Kozma dichotomy of pedagogy and technology with the inclusion of the teacher and the teaching labour process, that is to say, the delivery truck driver who

delivers the educational groceries. There is also a second dimension to this. Just as Kozma (1991) argued that the technology changes the learning, we argue that the technologies of blended learning potentially change the teaching labour process. The conditions of employment, the organisation of work and work identity are all affected by the introduction of ICT. Workplace technologies do not determine work satisfaction but certainly influence it. The technology itself is but one dimension which generates meaning, motivation and effort in a person's working life (Watson 2008, p.237), but it is nevertheless significant in our understanding of our own identities as academic teachers.

Our argument is that the traditional academic role as the creator, developer and delivery agent should remain the pivotal role in higher education if the quality of academic working life is to be maintained. Quality of working life is integral to motivation, innovation and flexibility, all of which are the foundation on which quality higher education rests. In digital technology education, this can only be achieved if more emphasis and resources are devoted by institutions to developing the multi-media literacy of academics and developing sustainable work practices which benefit both teacher and student alike.

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