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Towards best practice in course design: A case study of flexibility and collaboration between users and developers in supporting process with technology

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Abstract

This paper reports on the development of an evidenced-based method guiding the review, design and development of higher education courses (programs), supported by a bespoke, purpose-specific software platform. It describes the outcome of a five-year process of development for both the method and for the supporting technology, where feedback was obtained from stakeholders across the institution, evaluated and enacted. The paper describes the best practice approaches embedded within the method, as well as the underlying theory bases and the procedures that contributed to the evolution of the current product. The lessons learned by the project team can inform others in similar higher education contexts thereby avoiding the pitfalls described.

Keywords

bespoke software development, user experience, systems approach to course design, stakeholder engagement, quality course design

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Introduction

In the current climate of increased competition across the higher education sector in Australia (Universities Australia 2013; Norton 2013), particularly in the context of online teaching, the need to be distinctive and able to offer something *more* to the student is part of the response (Siemens 2004). This need is particularly acute for Charles Sturt University (CSU) which has historically been one of Australia's largest providers of distance education. As online delivery has overtaken distance education as the preferred form of flexible, off-campus delivery, online learning has been embraced across the sector – beyond the universities that traditionally have catered for the distance education student. Thus, distance education universities, like CSU, are finding new competitors in their traditional markets.

CSU has responded to the challenge of increased competition by recognising the need for quality improvements in learning and teaching. Best practice in highly flexible, wholly online teaching and learning is seen as a marker of difference in the market. In addition, with the requirement from 2015 to report against the Higher Education Standards Framework (HESF) (Australian Government Tertiary Education Quality and Standards Agency 2015), the University has committed to addressing both challenges through a systems approach to course design and development. This approach stands in contrast to traditional course development practices, and individual or cottage industry approaches (Thomson et al. 2017), whereby academics may revise both units of study (e.g. subjects) and courses of study (e.g. degrees/programs) in isolated ways, without necessarily paying significant attention to the needs of the student or the needs of the professions in a coherent, staged and strategic manner. Daniel (2009) comments that the traditional industrial model approach of academics to both subject and course design is no longer good enough in a world where e-learning and online presentation is becoming the norm.

CSU's response has been to develop a university-wide, collaborative course design process (CDP) which is supported by a bespoke software design tool called *CourseSpace*©. The software frames a fluid, collaborative process within a construct of standards with aligned learning outcomes, assessment, learning and teaching strategies and content. Assumed within the CDP is an "online by design" approach, whereby all CSU courses are to have an online presence and comply with the CSU Online Learning Model (OLM) (http://www.csu.edu.au/division/learning-and-teaching/home/online-learning/online-learning-model).

This paper describes a case study in which best practice in course design for online learning resulted from collaboration between the academics responsible for course design and a multifunctional support team whereby all stakeholders, students included, engaged early in the design and development processes. This approach ensured students' and industry needs were met while at the same time a parallel and complementary process was in play to ensure that the concomitant functionality of the software was developed as desired. The software development process evolved over time adopting an "agile" approach through incremental delivery, in collaboration with end users, and based on prioritisation of features. Prototyping, review and feedback sessions within development iterations enabled quick feedback and the resulting software to accommodate multiple stakeholders in a cumulative and adaptive manner. A by-product of this process was the generation of new ideas and the software being used in ways not identified during the early requirements stages.

This case study offers insights into improving practice through collaboration and user experience (UX) input. The CSU experience is an example of the theory – practice nexus whereby meeting the needs of the stakeholders in course design and development changed practice, and thus provides an opportunity to critique and inform theory.

Literature review

According to contemporary literature on course design, there are a number of key characteristics representing best practice which are worth noting. Included among these characteristics are backward and iterative design approaches (Verstegen, Barnard & Pilot 2006; Wiggins & McTighe 2005), constructive alignment (Biggs 1996; Biggs 2014; Biggs & Tang 2011a), collaboration (Chao Saj & Hamilton 2010; Friend & Cook 2013), distributed leadership (Jones 2017) and feedback (Auhl, Wood, Thomson & Whitford 2016). The assumption is that best practice is a systematic design process which positively impacts student engagement, hence their overall educational experience (Kahu 2011). This requires that institutions "intentionally design all curricula and co-curricular activities to activate student motivation, build academic skills, promote discipline and student identity, and develop student's self-efficacy" (Australian Government Tertiary Education Quality and Standards Agency 2016) which will be measured through the university's internal Student Experience Survey (SES).

Given the compliance requirements and the need to address course design at an institutional level, the notion of backward design is an essential component. Backward design is an intentional, informed, contextual process concerned with "big picture" outcomes (Wiggins & McTighe 2005). It systematically maps a clear pathway from assessment, through course learning outcomes to standards. This approach also allows for the selection of a range of learning activities and opportunities along the pathway to support learners to successfully complete assessment tasks that demonstrate achievement of the outcomes. The process is iterative in the sense that the design can be modified at any point in the process, frequently as a result of stakeholder feedback, (Verstegen, Barnard & Pilot 2006) with an eye on the big picture.

Backward design starts with the end point of achievement of the course of study – the standards – and aligns backwards to determine course learning outcomes, assessment, content, learning and teaching strategies and activities. Each unit of study within the course defines its particular outcomes and includes assessments and learning experiences designed to meet these outcomes, while having a clear place in the overall design of the course of study. A key strength of backward design is as an intentionality that results in constructive alignment by making "deliberate connections between student outcomes and course structure, content and delivery methods" (Emory 2014, p. 123). At the same time, students know where they are heading as they learn, informed by the standards. The end point of learning is always in the forefront of the mind, and visible (Emory 2014; Wiggins & McTighe 2005).

Another important component of best practice in course design is collaboration. Friend and Cook (2013) describe a collaborative style as having particular, defining characteristics such as being voluntary in nature, requiring parity among participants, being based on mutual goals, involving shared responsibility for participation and decision making, sharing resources, and sharing accountability. The main argument for adopting a collaborative development model is that it allows all relevant stakeholders to have input into the process at points along the development process. Further, designing high quality online courses requires various sources of expertise not usually possessed by one person (Chao, Saj & Hamilton 2010). Multifunctional, collaborative teams bring different sources of expertise to the process of design. In addition, collaboration across these teams acknowledges different drivers of the course and helps address the needs of different stakeholders (such as online learning and the need to incorporate online learning principles).

The literature on improved quality in higher education notes multidisciplinary collaborations as a common characteristic (Henard & Roseveare 2012; Zundans-Fraser 2014). Successful collaboration rests on building respectful and trusting relationships (Daniel, Auhl & Hastings 2013). Such relational trust has a number of dimensions including interpersonal trust, interactional trust, intersubjective trust, intellectual trust, and pragmatic trust which intertwine to create a collective intelligence (Edwards-Groves, Grootenboer & Ronnerman 2016). Problem solving can occur collaboratively, through the collective intelligence within a group, providing solutions that reflect the capacities of the group rather than an individual.

In addition, best practice also includes a consideration of leadership. In the higher education (HE) context, distributed leadership is frequently promoted as being more effective than traditional, more hierarchical models. Distributed leadership focuses on leadership practice, rather than specific roles and responsibilities. It is associated with shared and extended leadership practice, building an organisation's capacity for change and improvement (Spillane 2005). Distributed leadership provides "a less hierarchical approach that takes account of its specialised and professional context…collective collaboration rather than individual power and control…to build leadership capacity in learning and teaching" (Jones et al. 2012, p. 67). Distributed leadership affords the opportunity for all stakeholders engaged in an initiative to fully share in both the development and ownership of the initiative. In a sense it is a self-organising approach to design. It allows for the collective intelligence within a group to emerge and for feedback from team members to occur (Bain 2007). This grass roots feedback allows the process to continuously develop, purposely informing the next stage of evolution in the design (Pascale, Millemann & Gioja 2000). Thus, distributed control and emergent feedback in the design process encourage change and adaptation, ensuring bottom-up problem solving (Bain 2007).

Stakeholder feedback, particularly from end users, is also critical in the process of software development. There are two main approaches related to software development, each specifying varying levels of engagement with stakeholders along with different approaches related to the requirements analysis, design, testing, and release of the software. The traditional highly planned and linear approach, often called *waterfall*, "plans for upfront and anticipates all the features a stakeholder or user might want in the end product" (Rubin 2013, p. 29), determining then the design and best way to build those features. This sequential planned approach (analysis, design, test, build) with a single release at the end of the project proved problematic and inflexible when dealing with changes to requirements. Embracing the principles of flexibility and adaption to improve speed and quality of outcomes, *incremental* and *iterative* development approaches can evolve. Incremental approaches allow for piecemeal or incremental growth with features being added to each software increment as a "subset of the envisaged product" (Mistrik et al. 2014, p. 6). Feedback can be gathered at an earlier stage to contribute to ongoing development and earlier adoption. Iterative development is used where shorter repeatable development cycles are desired to incorporate feedback. This enables a maturing of the software as knowledge of requirements increases over time (Mistrik et al. 2014, p. 7).

The second main approach to software development encompasses the agile software movement which emerged in 2001 (TechBeacon 2017). The philosophy of agile places emphasis on individuals and interactions, customer collaboration and "responding to change rather than following a plan" (Knaster & Leffingwell 2017, p. 30). Rapid feedback and a willingness to change are key characteristics with "little set in stone at the beginning of the project" (Rubin 2013, p. 32). Agile embraces variability to create a unique product through feedback and adaption, employing iterative development. Requirements are prioritised and grouped into incremental releases of the product in a non-linear manner (Rubin 2013, p. 32). The team is empowered/self-managed and works

collaboratively to design, develop and test the functionality all at once in each iteration, rather than analysing all requirements, then doing the design, test and build. An integral aspect to the success of the product is the User Experience (UX) which includes the approach to user interaction, the ease of use, efficiency in performing tasks, and how well user expectations are met. Agile places the user in a position of control involved in a collaborative partnership with developers on a daily basis (Kautz 2009, p. 168). This interaction with users is critical in gathering information to produce new ideas for products (Stock & Zacharias 2010, p. 874) and user involvement at an early point is particularly advantageous to avoid the disconnection that can occur between users and producers (Trott 2017, p. 500).

To summarise, best practice in course design processes and software developmental procedures share a set of common characteristics: collaboration; emergent feedback; and self-organising, distributed control. With this in mind, staff at CSU embarked on an ambitious project of developing a course design process and supporting design software to instantiate these practices, particularly in order to bring about cultural change across the university, as described in the case study below, in course design. A further intended outcome was to outperform new competitors in their traditional markets. The improved performance is assumed to be underpinned by using the CSU course design process combined with the evidenced-based software tool that demonstrates backward design and constructive alignment to apply to the university's online and face-to-face offerings.

Case study: course design process and CourseSpace, Charles Sturt University

As part of strategic planning, CSU determined that the development of a consistent, university-wide approach to the Course Review, Design and Development (CRDD) process, alongside governance requirements, was consistent with its desire to implement best practice in presenting an online course profile. This best practice, as evidenced in research, assisted the institution in meeting its obligations under the HESF (2015) described earlier. This evidence-based practice in terms of process, coupled with supporting software and concurrent policy development, is considered by the university as contributing to a higher quality of teaching and learning underpinned by well conceptualised courses, which will in part also contribute to enabling a competitive advantage within the sector.

The course design process

Using elements of backward design (Wiggins & McTighe 2005) and iterative design (Verstegen, Barnard & Pilot 2006) described earlier, along with implementation of cycles of feedback (Hattie & Timperley 2007) from stakeholders allowed for a process to develop driving quality courses and continuous improvement. A similar approach as was used for the refinement of this process was also used in the development of the software. Evolution was informed by consultation with those responsible for implementing the design process, thus allowing for continuous improvement to occur.

In backward design, assessments have a direct line of sight back to the standards defining the course. These standards are those defined by both external stakeholders – such as accrediting professional bodies and standards required under the Australian Qualifications Framework (AQF) – and internal institutional requirements (such as graduate attributes). Implementing backward design means that subjects then emerge by grouping assessments that have similar discipline aspects. While having a close relationship with backward design, the more iterative nature of the design approach allowed flexibility to meet the needs of both differing levels of course review (from those requiring little change to those requiring major revisions) as well as courses at different AQF levels. Important was

the recognition that for the majority of courses, a solid framework of existing materials was already in existence. This meant that the approach required close interrogation of existing assessment regimes and subject based materials to ensure internal alignment at subject level (Biggs 2014), but also that materials clearly served a role within the course as a whole. Figure 1 below represents the design process.

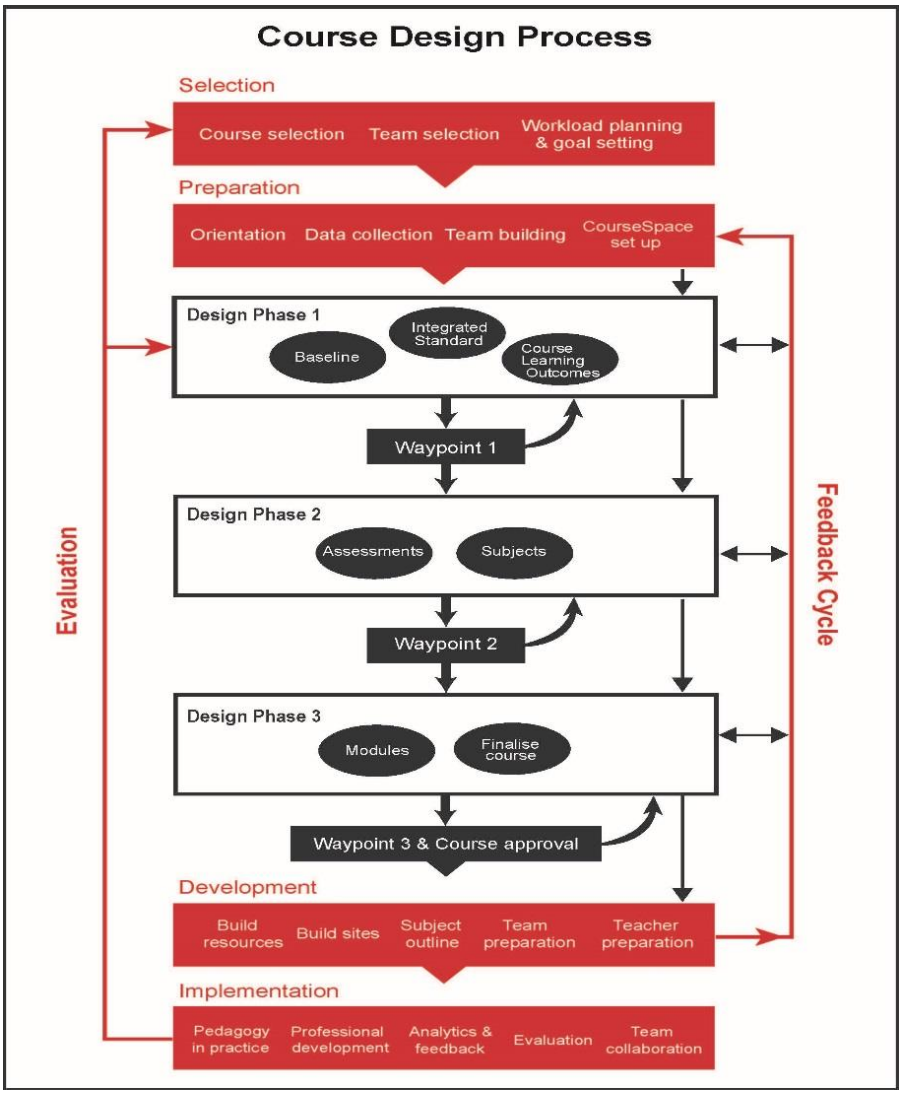

Figure 1. *The course design process as developed at CSU showing backward and iterative design approaches, and cycles of feedback.*

As shown in Figure 1, the design process consists of three major stages. At Phase 1, significant planning occurs, including attending to information available such as Course Experience Questionnaire (CEQ) outcomes. Necessary standards guiding the course are examined and integrated, resulting in course learning outcomes (CLOs). Phase 2 requires development of assessments to meet the standards and CLOs determined in the earlier phase. These assessments can

then be grouped into areas of similarity to create subjects. Allowing subjects to be defined in this manner ensures that subject learning outcomes are derived from assessment tasks, which have a line of sight back to the sets of standards that framed assessment construction. Phase 3 requires development of modules which organise content, such that clear alignment is driven between what is taught, what is assessed, and what is seen as required within the course (Biggs 2014; Biggs & Tang 2011a). These modules, at the design phase, consist of identifying learning and teaching strategies, and learning activities, consistent with subject learning outcomes. While recognising that this process involves spending more time in designing courses, expenditure of this effort means considerably less time is necessary in the development. For a sector where a high degree of casualisation of the workforce is typical, it also expedites tightly designed courses and subjects being developed by casually employed academic staff.

Figure 2 below shows how each stage of the process is supported by the bespoke software, CourseSpace.

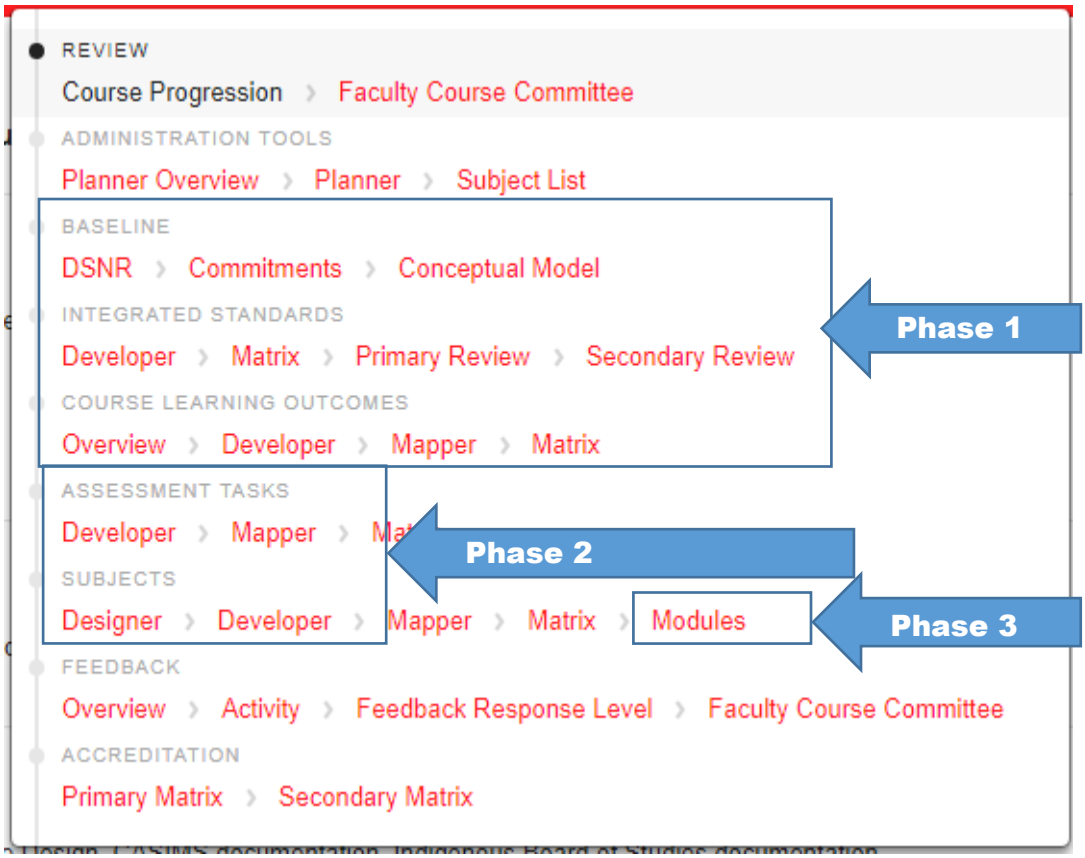

Figure 2. *The relationship between process and technology*

CourseSpace allows for a variety of administrative tools, however the close alignment between the stages of the process and the software are clearly visible. Phase 1 is supported by the baseline integrated standards and course learning outcome sections. Phase 2 is supported by providing a collaborative space in which to design and receive feedback on assessments and to create subjects within the course, while Phase 3 provides a similar collaborative space for the development of

module-based materials. In this way, the software helps to support academics with the cognitively demanding tasks of developing materials that are thoroughly aligned both internally and externally for the course as a whole.

User engagement

The design process and software development experience of CourseSpace demonstrates a learning curve in relation to the importance of the connection between the course director, the academics working on a course review, the course design project team and the software developer. The experience to date can best be understood in three stages.

Stage 1 is the early adoption courses (EACs) stage which trialled the process and the first version of CourseSpace, Stage 2 is the Refresh stage where the initial direction was "refreshed" and the focus of the project narrowed off the back of experience of the course teams on the EACs, and Stage 3 is the UX stage which suggested new functionalities for CourseSpace not envisaged in the early development period in Stage 1 but which arose from use of the process and application.

Stage 1: Early development stage

The development of the course design process began in 2011 in the Faculty of Education with the intention of including both a methodology and technology to support a university-wide approach to course design and approval (Bain 2013). The model is based on an application of self-organising systems theory to education and was first developed for K-12 Education (Bain 2007) and then was introduced into higher education course design (Lancaster 2017; Zundans-Fraser 2014). The research behind the methodology incorporates principles of collaboration and consensus as well as constructive alignment (Biggs 2014; Biggs & Tang 2011a), criterion and standards-based assessment, emergent feedback and intentional learning design (Bain & Zundans-Fraser 2016; Zundans-Fraser & Auhl 2016; Zundans-Fraser & Bain 2016). The process, supported by version 1 of CourseSpace, was piloted over 2012–2013 with the review of the Bachelor of Education (Early Childhood and Primary), working with both faculty and school level academics to test the concept, and trial *CourseSpace*. In 2014, it was then trialled on another two to four courses from across the four faculties of the university.

The development process of CourseSpace to support the process, in Stage 1 was an iterative approach on a three-week cycle of prototype delivery. There was an external developer and in-house project team, along with faculty input, contributing to developments. User requirements were synthesised in consultation with academics in one faculty. The project team mediated the collection and production of these requirements. Initially, the development team had limited connection to the end users. This meant that the developer did not have a close connection to the customer and through the mediation processes sometimes lost sight of what was being requested. Further, the prototype was developed based on information which largely came from one faculty rather than from across the wider institution. In addition, there was no user advisory group which could represent the multiple customer needs. The early prototype was quickly adopted as a production system which had not been significantly "road tested" with the wider user base. Early reports from users indicated a level of dissatisfaction. In response to user feedback, a critical review of the early development stage was undertaken, for both the process and for the supporting software. Frequently, end users conflated the process and the software, such that their dissatisfaction with the software spilled over to the process.

Information informing the review was collected through informal interviews, surveys and focus groups. The sources of evaluation were attributed to users such as course directors, educational designers, teaching staff, discipline leads and subject convenors across the full span of the university; and non-users, such as advisors and industry representatives.

The review highlighted the following areas of dissatisfaction: course design knowledge and skills; timelines and workload allocation; gaps in professional development; limitations of CourseSpace and its integration with other CSU systems; and emergent feedback, collaboration and communication. These issues are briefly summarised below.

1. Course Design Process

While the course design process was received positively, particularly in relation to baseline and standards, there was generally a poor understanding of the overall process of backward design and constructive alignment.

2. Timelines and Workload

The overwhelming view was that the one-year timeline for the process was too tight. The workload associated with the process was considerable and had not been factored into the annual workload of academics working on course design.

3. Professional Development

Existing professional development was generally well received, but gaps were identified, in particular in the purpose and approach to emergent feedback, working in collaborative teams, and managing the teams by the course directors.

4. CourseSpace

Users identified the greatest benefit of the CourseSpace as its ability to capture information. Significant frustration was expressed about the limitations of the software including poor editor functions, a clunky interface, unfamiliar terminology, lack of visual connections between aligned components and lack of capacity to export data for interrogation by accreditors and other stakeholders.

5. Collaboration

Collaboration was identified as a new way of working on design. It was evaluated with mixed views, noting a lack of experience working in teams by academics with time and workload seen as limiting factors; however there was unanimous recognition and appreciation of the commitment by educational designers and their support for the process.

6. Feedback

User responses were mixed but generally feedback was not seen as authentic, participants lacked the skills for constructive feedback, and the software was seen to frustrate the process.

7. Communication

While the course design leads in the project team generally received praise for their role and assistance, the overwhelming concern was that critical feedback from the pilot and trials was not

being taken on board by the project team. In addition, there was a view that faculty level leadership and support had been very limited. And importantly, the drivers behind the change in the review process and the theory underpinning the course design approach was not clearly communicated. Common questions included: *What was the process based on? What does the new approach mean? Why we are doing it this way?*

8. Cultural Change

Not only did the process depend on an increased scrutiny of individual subjects, both in terms of the course/subject interface, and academic work being made visible in terms of subject development, but it required academics to utilise technology in the creative design process of developing subjects. The impact of such cultural change, including a fear of losing the power of academic input to a process based in technology, was identified as an issue to be addressed.

In relation to the project team and their ability to manage the software development process, the implications of waterfall and agile software development approaches were not obvious in the early stages of the course design project. CSU had not formally introduced agile, projects were typically waterfall and the approach was heavily influenced by the relevant project leader based on their background and expertise. At the time, the project team comprised experts in the education field and was not a formal enterprise IT project. There was a lack of IT expertise on the project. Minimal input and feedback was obtained from end users in regard to both the course design process and how to develop the software. The external development team had minimal interaction with the project team and no interaction with end users. A disconnect existed between the project team, the developers, and end users. Consequently, the first and second releases of the CourseSpace software in 2012 and 2014 were error-prone and lacking in features, and negative feedback was received regarding the user experience.

Stage 2: Refresh

Early in 2015, the review described above culminated in a crisis meeting between university learning and teaching leadership and the academics impacted by the trialling of the process and application. The outcome of the meeting was a commitment to "refresh" the project by narrowing the scope of the work from a whole of institution change to a focus on course design and by addressing the specific course design and software development issues. At this time, staff changes occurred and formal IT project resources were allocated to the project. An agile approach was also adopted. The refresh was addressed through a revised implementation plan which formalised the communication between users and project team. User recommendations for improvements of both the process and the software framed a new action plan aimed at resolving them. A new committee, the Design Process Working Group, gave users a voice in relation to process improvements. These improvements aimed to drive improvement in the learning/teaching business of the university by ensuring a clear, consistent process consistent with literature and, initially, aligned to existing governance procedures. This established an ongoing dialogue between stakeholders and ensured accountability to address issues of concern. During this period, the Design Process Working Group was able to address the following:

- the kind of membership and size of course teams,
- the need to meet key milestones at key times,
- the need to refine the waypoint approval process (each review is presented for approval in stages known as waypoints),
- the gaps in knowledge and skills, and

- the reluctance of staff to use the software during the design process.

Concurrent to the refreshing of the process, and its focus on driving improved learning/teaching practice, concerns with the CourseSpace were also being addressed. While much of the feedback in relation to CourseSpace was emotive, there was also a valuable list of user requirements gleaned from user experience and frustrations with the interface and various design limitations.

The requirements were prioritised and approved by a new committee structure – a technology working group which brought in the different stakeholder perspectives. Within a quasi-agile methodology, which allows responses to user needs and suggestions in a far timelier manner by implementing a series of smaller amendments, a series of changes were implemented. With a desire to secure some "quick wins", these requirements were converted into user stories which were analysed by a user requirements group before being packaged into sprints and passed to the vendor. Returned sprints were then tested by a user testing group and then a systems officer conducted regression testing. Once all was working as intended, the sprint was released in an incremental approach. During this stage, the project team released nine sprints, addressing issues such as useability, feedback, exportability and associations between components within the system. The refresh stage addressed the need to bring the customer closer to the development process through a formal consultation process enabled by the various stakeholder groups such as the Design Process and the Technology Working Groups and the User Requirements Group.

Stage 3: User experience (UX)

With refinements to the process now in place, having addressed many of the legacy issues, the project team's work was not complete. The technology supporting the process, CourseSpace, was still in need of further modification. Despite having secured numerous quick wins during the Refresh period which increased user satisfaction, the software was still suffering from some of the early, untested assumptions, particularly in relation to how users would engage with the software. As more and varied users began to use the software, the users wanted to use it for unanticipated purposes; for example, to identify specifications through tagging, to utilise the application at any stage in the process, and to see visual representations of the connections and associations between the components. Changes were made to bring together the external developers, the CSU project team, and end users to work together in collaboration as a cohesive extended team, focusing on the user experience. End users now participate in prioritisation sessions, requirements and design workshops, feature reviews and user testing. They have become the centre of the iterative development process and a shift has occurred in the design efforts to focus on how CourseSpace can improve the course design practice and ultimately learning and teaching in CSU. The result of this was a recognition that parts of the back-end database needed to be "re-architected" and the interface needed to be designed differently. This activated user experience workshops which produced a wish list of navigational and functional innovations. This list is being addressed using the same incremental approach supported by the quasi-agile methodology. In addition, the project team has now developed a road map of changes organised in a quarterly release schedule. As an example, workshops and prototyping with end users in recent months has resulted in the development of a "connection viewer" feature in CourseSpace to visualise in a graphical way the relationships between content in a course, enabling identification of where gaps may exist or where "overmapping" may have occurred. This feature was released in August 2018 and positive feedback has been received.

The development strategy has evolved into an extended team, comprising the developer, the in-house project team and one advisory group representing customers' needs, bringing both process and software issues together into one forum. This represents a further step in maturity of the project, the result being that the customer is now central to the development/production process.

Based on this final stage of UX, and looking towards being able to support ongoing development post project, the project team has learned that this incremental methodology is an appropriate approach to maintain momentum and to build the expectation of continuous improvement. In this process CSU has been able to synchronise and integrate top down (strategic), bottom up (supportive) and inside-out (human-focused) strategies which are essential to overcome natural resistance to change (Uys 2007). Top down strategies include the careful selection of courses for design and development and prioritising the features for development, while the bottom up strategies include support from three dedicated course design leads, a business analyst and educational designers. The central inside-out strategy is about involving the customer in the systems development process as a key partner thereby creating ownership and a positive view of the system.

Of ongoing importance to the team at this point was the recognition that the ultimate focus within the project was the delivery of better student experiences by developing a process that drove course level and subject level alignment. This process was to be supported by a software platform aimed at reducing the cognitive load (Sweller, Ayres & Kalyuga 2011) on curriculum developers, thus allowing them to focus more fully on the design process. Ensuring alignment between assessment, subject outcomes and teaching, as driven by the process and software, has consistently been shown to enhance student achievement (Biggs 2014; Hattie 2009).

Lessons learned

By 2017, the project had been running for five years and had succeeded in supporting 53 courses: 26 courses through to approval, with 27 courses in progress. At this point in time, to benchmark the process and application, senior learning and teaching leaders chose to review the process through simultaneous internal and external reviews. The internal review was led by the project governance committee, while the external process was conducted by an internationally renowned course design specialist, supported by a reference group comprising three Australian universities' leaders in course design and development.

The outcome of both reviews was a commitment to mainstream the process and software across the university from 2019, and a commendation on the value of the process and the tool:

> *Charles Sturt University is to be commended on their work to create a new and innovative tool for curriculum mapping and course design (Conole 2017);*
>
> *The course design initiative and associated supporting systems are seeking to engender new ways of working and shift long held higher education cultural traits all within a dynamic external context introducing new standards (Higher Education Standards Framework and Australian Qualifications Framework); (Conole 2017):*

In addition, a combined set of 24 recommendations was endorsed by the Vice-chancellor's Leadership Committee. These recommendations articulate:

- some final enhancements to the process, particularly terminology;
- enhancements to the tool, particularly in relation to flexibility;
- professional development; and
- promotion, particularly by senior leaders.

As the project period comes to a close at the end of 2018, the project team is addressing these recommendations as one of two final tasks of the team. The other task is the conduct of an ethics-approved, longitudinal evaluation study of users. This research will be conducted over a three-year period to ascertain the impact on staff and student experience as the new designs of courses are road tested by students.

However, the 2017 review revealed that new course directors embarking on course reviews using the process and the application have begun to voice their appreciation of this new capability. Collaborative, diverse, multi-professional teams making consensus decisions on design specifications have begun to be valued, representing a cultural shift in design practice. One course director, interviewed by the external reviewer has observed:

> *The course review and design process via the three phases within CourseSpace has been extremely beneficial to both the course and also course team. The process has enabled the inclusion of newly developed, industry specific standards and the review of course learning outcomes, assessments, modules and subjects to be undertaken in line with these new standards, changing nature of the discipline area and the online nature of subject delivery. This has enabled the course to meet not only its commitments to the students but also to the industry for which it serves. (Course Design Project Team 2017);*

With the project now moving towards completion, it is timely to reflect on lessons learned.

- With increased customer involvement there is an increased sense of ownership by users involved in the course design process as partners *and* by the project team and wider reference groups who collaboratively develop requirements and then collaboratively test the implementation of these requirements and provide feedback on actual use of the system.

- The regular releases of software sprints build momentum and positive views of the project and the software, as well as the ongoing expectation of improvements by the users and university leaders.

- Integrating a top-down, bottom-up and inside-out change process leads to user greater acceptance and ownership.

- The new process of involving users as partners in the development process means that the process takes longer but the benefit of customer satisfaction is the payoff.

- Winning hearts and minds and explaining the reasons why change is required is a critical component in changing cultural practices if quality and continuous improvement is to be achieved.

- For cultural change to occur, professional development (PD) of end users, along with policy development to underpin the new practices are essential throughout the design period. The PD needs to be "just in time" at each phase of the design process to ensure course team members are using the software appropriately and grow in their understanding of best practice in course and subject design.
- In terms of design process specifications, the following are important in the process of continuous improvement:
    - Multi-functional course design teams should ideally comprise a course director, a course design lead academic, an educational designer, a discipline lead and discipline representatives with a preferred team size of five to seven members.
    - Meeting key design milestones is critically important in order to meet the university approval deadlines.
    - Efficient approval of course reviews requires an informed approval committee. Professional development of the members of the approval governance committee is essential, as is a willingness by committee members to interrogate the design within the software tool.

Conclusion

The course design process is now at a point where is has become business as usual at CSU. The uptake of the process has achieved "critical mass": over 25 per cent of courses have been through the process; staff are now aware of its value and understand the approach. The process is explicitly supported by policy, the Course Review, Design and Development Policy, and CourseSpace is available to support course teams as they engage in course review, particularly for online courses. Notably, the refinement of CourseSpace continues. As users provide feedback, the software will undergo continued modification to meet the needs of the users and compliance requirements of the university.

In aspiring to best practice in course design and development as well as in the development of software which supports that practice, the experience of the project team has highlighted the nexus between theory and practice. This is exemplified in the stages of the project which can be understood as having been a process of maturation: a process of instantiating theory in practice. The original project set out to introduce a new way of working supported by a new kind of software tool. Yet, despite theory alerting the team to the importance of grass roots emergent feedback (Bain 2007; Kautz 2009; Pascale, Milleman & Gioja 2000; Stock & Zacharias 2010; Trott 2017), it took multiple stages and a number of years before the authentic engagement of users/stakeholders in the design and development of the course design process and the software tool emerged.

The project has demonstrated what happens in a development process when the user is not included as an integral partner from the beginning. Fortunately for the project, the iterative approach supported the maturing of the design process and the development of software tool as new knowledge of requirements surfaced over time. The project was able to adapt and adjust during its stages. In particular, it provided opportunities to shift assumptions in relation to the software development, allowing for greater functionality and eventually a new interface to provide ease of navigation and connectedness of the components of the product.

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