'Over the Edge of the Wild': Lessons of Discovery Through Developing Transdisciplinary (Breadth) Units in Blended Courses

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Abstract

Universities are increasingly recognising the need to broaden the experience and understanding of their students beyond a single disciplinary approach, to produce graduates more capable of solving the problems of a multidisciplinary world. At the University of Tasmania, a "breadth unit" programme is underway with the dual purpose of evidencing student experience in graduate attributes and developing transdisciplinary approaches for interpreting the complex challenges (or "wicked problems") of the real world. All breadth units are developed by lecturers working in teams across multiple faculties, all units must be capable of being studied off campus, and several have on-campus options (meeting the University's requirement for blended learning). Breadth units are being built into student study plans, with most students required to study at least two units as part of their undergraduate degree.

The initiative, which commenced in 2013, uncovered challenges in administrative and academic systems that might have been predictable, but were often surprisingly intractable. Administrative systems have had to adapt to university study moving out of faculty silos. One-year-on reviews of units following their introduction capture the delivery experience (from lecturer and student perspectives) and provide vital feedback on learning design for quality improvement. Teaching teams now confront how best to sustain the blended approach as enrolment numbers increase.

This paper raises some of the issues to be tackled and suggests indicators for the success of this initiative.

Key words: learning design; blended learning; transdisciplinary; online; multidisciplinary; administrative systems

Introduction

Many universities are now addressing the need to broaden the experience and understanding of their students beyond the boundaries of a single disciplinary approach, to produce graduates with a 'rounded perspective' capable of operating in our multidisciplinary world. The purpose of this paper is to explore the practical implications of this trend on the delivery of such units into the undergraduate curriculum. It does this by exploring the experience of one university in Australasia—the University of Tasmania (hereafter, the University)—which has purposefully committed to integrating such units into the curriculum. Because this approach to undergraduate education is relatively new, the paper is not intended to be a definitive study; rather, it describes the lessons learnt in the attempt to implement the units. The units discussed are required to be

developed collaboratively and delivered online; the implications of the experience revolve around the limitations of a system as much as their effect on online course development or student experience. The paper starts out with a review of the University's approach to "breadth", before exploring early discoveries in the initial implementation phase, challenges to administrative systems and learning delivery, and student feedback and performance. It then moves to a discussion of the implications of implementing breadth as raised by the Tasmanian experience, including questions of unit design, staff collaboration, and the challenges associated with making so-called "wicked problems" the focus of such units. In light of this discussion, and informed by the academic literature, the paper raises a series of questions for further study, and concludes by noting the inherent irony of implementing significant curriculum change in universities; namely, the extent to which such implementation (perhaps uncomfortably) exposes the institution to the very challenge it sets its students.

Historically, universities have commonly given students the opportunity to sample elective units from different faculties as part of their degree courses, thereby providing experience of different disciplinary 'norms'. A more generalist approach has been to introduce core subjects that cover cross-disciplinary topics relevant to all courses, and in which multidisciplinary understanding may be incidental to the required learning outcomes. A third approach is the development of purposely designed interdisciplinary courses that span several traditionally taught disciplines and focus more on emerging job opportunities (an early example being Environmental Studies). "The focus on preparedness for the workforce and the beneficial skills of interdisciplinary curricula reflects the trend in education towards skill development" (Millar, 2016, p. 3).

Lastly, there is the approach of the "breadth unit/subject". One definition, such as that adopted by Murdoch University (2016), is to say that these types of units "are designed to introduce students to knowledge outside of their chosen discipline, teaching them to understand how others think and solve problems". Their purpose is to bring academics from different disciplines together to develop and teach on a topic with the purpose of being examined through different disciplinary lenses which provide complementary or contrasting understandings reflective of a real-world context.

Terminology

This paper uses the following Australian terminology:

- A *unit* (equating to a "paper" in New Zealand) is the smallest typical section of student enrolment of one semester's duration. A full-time study load comprises four units per semester.
- A *course* describes a programme of study, which is 3 or 4 years for a typical undergraduate degree.

The following distinctions have been applied to describe an approach that encompasses more than one discipline (adapted from Scott & Hofmeyer, 2007):

- *multidisciplinary*: comprising several disciplines operating together
- *cross-disciplinary*: going across different distinct disciplines
- *interdisciplinary*: communicating across traditional disciplinary boundaries
- *transdisciplinary*: moving beyond (transcending) disciplines towards a holistic approach to student learning without obviating the central importance of disciplines.

The blended learning model as employed by the University requires that every unit incorporates access to quality online resources and interactivity. Many—including breadth units by requirement—can be completed entirely online at a distance but may also have a parallel option incorporating on-campus activities.

Tasmania's approach to breadth

The Breadth Unit Initiative at the University was originally conceived to evidence graduates' experience during their studies in each of the generic graduate attributes. The Curriculum Review Committee soon saw the potential for using carefully selected topics that would offer students insights into the complex challenges (or wicked problems) that they would face as graduates, and for doing this from a transdisciplinary perspective. (Two original examples of such units are 'Confronting Sustainability' and 'Living with Cultural Diversity'.) The units needed to concentrate on real-world issues that are appropriate for all students irrespective of discipline (e.g., sustainability, leadership, and ethics). This, in turn, would better address student employability (i.e., job readiness) and improve the student experience through enhanced curriculum diversity. This university is no different from many other research universities in that the disciplines are the starting point for academic discussion; indeed, they are the very basis of academic life. However, the usual way of delivering global perspectives to an undergraduate cohort consists of requiring all students to take a small handful of common compulsory units. To put in place an entire suite of 'breadth units' that require knowledge from a variety of disciplines to be brought together into a coherent whole, to address current issues of our time, and then to give students the choice of which units to take, represented a significant shift in thinking.

In sum, the University's approach to breadth—its focus on complex world issues and the variety of options provided to students—appears to be almost unique to Tasmania (Dibben, 2017). Units are compliant with the University's Blended Learning Model (University of Tasmania, 2013), which means all can be studied off-campus, several include on-campus support alternatives, and individual and group project work demands high-level student interactivity and application in developing individual perspectives. All breadth units are developed and taught by teams comprising representatives of at least two faculties. At both the University of Tasmania and Murdoch University, students are required to select breadth units from a range on offer at Levels 1 and 2, with additional options also available at Level 3.

Establishing breadth unit development

The breadth unit development programme commenced at the University in 2013 with the establishment of guidelines and the introduction of an 'expression of interest' process from interested cross-disciplinary teaching teams (University of Tasmania, 2016a). This is a priority initiative for curriculum renewal and, because the resourcing and workload implications for the novel cross-faculty approach are acknowledged, team work for the preparation of new breadth units is provided with central support in the form of incentivisation funding (to faculties) and design advice. Of particular significance to this discussion is the requirement that units "can be delivered consistent with the [University's] Blended Learning model, either fully on-line or both fully online and face to face" (University of Tasmania, 2016b); hence the importance of understanding good learning design for online delivery to off-campus student cohorts.

Every undergraduate programme at the University is required to build breadth unit options into study plans and, with most students required to study at least two units, the projection is for up to 40 units to be available. Three units were initially approved for development in the first funding round and, as part of the support provided to teaching teams, a community of practice was established. This community is coordinated by a senior teaching fellow who has regular access to senior management to help iron out any emerging difficulties. A "one-year-on review" was inherent in the original plan. Consequently, an educational developer reviews each breadth unit implementation, and makes recommendations. The review focuses on the perspectives of both the teaching team and the students rather than the actual subject content.

Early discoveries

> There are no safe paths in this part of the world. Remember you are over the Edge of the
> Wild now, and in for all sorts of fun wherever you go (Tolkien, 2012, p. 161).

At an early stage in discussions it was recognised that there would be some interesting issues for teams to negotiate (one of the first being that of preferred referencing style), but the realities of moving outside the mould with unit development have uncovered unforeseen incompatibilities in administrative and academic systems. It proved a challenging journey leading up to the first year's (2014) experiences of introducing breadth units into a university whose systems and processes were not geared to implementing them (Dibben, 2017), and the pioneers faced unique logistical hurdles along the way. In translating the breadth unit idea into reality, we divide the challenges into two types: administrative systems and learning delivery.

Challenges to administrative systems

The first three units approved for development were delivered at the University in Semester 2, 2014. A range of logistical issues quickly emerged (Dibben, Phegan, & Brown, 2014), providing ample support for Golding's assertion that "the administration of an interdisciplinary subject tends to be more problematic than other subjects" (2009, p. 9). Confusion arose over what constituted appropriate distribution, and timing of funding and revenue. Incentivisation funding was originally delivered in two equal increments: development (upon approval of an expression of interest) and delivery (at the commencement of the first semester of teaching). Questions arose as to whether this was a fair representation of the effort (and staffing) required. Issues also arose when, for example, unit developments that were bound by an annual funding model spanned the date boundary – as was inevitable for units destined for February delivery.

Unit development contract approvals required a defined percentage split of relative contribution between faculties to fund staff input appropriately; but this may not be constant across development and delivery phases, and different levels of staff seniority may be involved at each stage. Administrative funding models are not sympathetic to changing mid-stream.

Unit coding also caused confusion. Early resistance by university administration to creating new unit codes nearly threatened the viability of the whole Breadth Unit Initiative. It took considerable effort to convey, to all supporting areas, the significance of moving from a single faculty identity to a transdisciplinary learning experience and the need to be accommodated by university systems. (This was eventually achieved for the second semester of breadth unit delivery by including new non-faculty coding throughout university systems and student study plans – a considerable achievement!)

As these issues were becoming apparent, a new Cross Faculty Learning and Teaching Committee was established to administer the breadth unit approval process and formulate sensible solutions to emerging challenges to traditional faculty-based administrative systems.

Challenges to learning delivery

> Interdisciplinary subjects present multiple, and often conflicting, perspectives and ways of
> knowing. These need to be coordinated in some way so the students have a coherent and
> rewarding teaching experience, and so the subjects do not become a confused muddle.
> (Golding, 2009, p. 7)

Breadth unit development requires the input of disciplinary experts with interdisciplinary insight (Golding, 2009, p. 7)—a challenge that has frequently engaged senior academics. Significantly, the incentivisation rules require units to be available for study online—and while most of the

University's teachers are becoming conversant with the University's Learning Management System (LMS) it is evident that many lack experience in holistic design for distance learning. Some issues tend to be amplified with cross-faculty teams when different disciplinary norms apply.

The one-year-on review process developed and conducted by an experienced educational developer (ED) identifies issues that are important for quality improvement, as evidenced by student and teacher feedback. The ED accesses the completed unit online in the LMS, reviews unit assessment and engagement requirements, reads discussion boards, reviews evaluation reports, and interviews the teaching team. A standardised set of questions has been developed to inform the review process, a summary report is provided to the unit coordinator, and recommendations are made for improvements to learning delivery where appropriate. At the time of writing this process has been applied to fourteen undergraduate units.

Significant recurring issues emerge in the online delivery of breadth units. Some of these might be expected from teaching any content in the distance mode, but they are nuanced by the particularities of the Breadth Unit Initiative. Arguably the most significant in this context, and the most widely applicable, have been issues of consistency within an individual unit, the sensible use of discussion forums, equating online and face-to-face delivery, and planning for unit sustainability over the long term.

Consistency
Individual teaching styles can enhance a unit, but elements such as content organisation, delivery language (modules? chapters? weeks?), the assignment submission process, feedback, and delivery of grades (through the LMS?) need to conform. There are generally agreed consistencies within a single discipline but different disciplinary norms and styles cannot be allowed to confuse students in a transdisciplinary context.

Discussion forums
There was a tendency to include multiple online discussion forums in a unit, but the reasoning can be unclear. More forums did not equate with increasing interactivity unless they were used purposefully to develop the learning process. Students felt frustrated if expectations were not well communicated, especially when forums were added ad hoc throughout the teaching semester.

Face to face vs. online
Student perception and pedagogical requirements combine in the challenge of equivalence regarding online and face-to-face deliveries. This is a particular issue for the Breadth Unit Initiative in which online delivery is mandated, and the parallel blended mode (incorporating face-to-face) is optional; there is one unit code and the same intended learning outcomes for all offerings. The increase in online enrolment figures (200+ per offering) is proving to be challenging for facilitating interactivity, tutorial engagement, and assessment activities. Including group work is one obvious strategy, but the online mode amplifies the difficulty of organising and maintaining group activity. Also, in the search for equivalent delivery formats, the experience of sitting in a lecture facing an animated lecturer while surrounded by your peers, is not the same as logging in to the LMS to watch long narrated slide programmes.

Long-term sustainability
For initial offerings, teaching teams have been well funded by the incentivisation scheme, and the first unit deliveries have typically been to small-to-medium online classes that have been supported by casual tutors. This has been good for developing a novel initiative. However, because it has taken time for breadth units to be built into course curricula, the expected increase in enrolment resulting from compulsory breadth unit study is only now being realised. After the first offering of a unit, funding to faculties is normalised on the basis of student load, and staff-

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to-student ratios that were originally possible are having to change, with consequent adjustments to student–tutor interactivity. As part of the unit review process, the ED advises on judicious use of LMS features to encompass enrolment growth and a possible reduction in individualised staff support once incentive funding expires.

The ED's feedback to teaching teams informs the revised offerings. Particular consideration is given to the unit delivery rationale and support expectations of on-campus vs. off-campus students, thereby engaging lecturers in novel cross-disciplinary conversations on the demands of the blended approach.

Student feedback and performance

While the breadth units themselves have not generally scored differently from other online units in standard evaluation scales of content relevance, alignment, and perceptions of outcomes achievement, the comments made by students in formal evaluations have been hugely variable. There have been very different opinions expressed even within the same unit. For example:

> This unit…progressed my university education beyond my expectations.
> (anonymous student evaluation feedback, 2015)

and

> There is nothing useful about this unit, it is a complete waste of time and money.
> (anonymous student evaluation feedback, 2015)

One might expect this difference to be related to learning preferences, and that it might be shaped by the students' levels of maturity and life/work experience. It does suggest that the purposes and processes of a transdisciplinary approach should be introduced carefully to students.

The students' final grades have also shown no notable difference from those achieved with the University's conventional units. Lecturers have reported anecdotally that performance appears to be related to the level of student engagement; that is, those who contribute regularly to discussion boards and optional activities are more likely to do well. (The literature would also lead us to expect this; for example, as summarised by Beer [2010].) Little formal data has been accumulated from the breadth unit experience so far, and statistical comparisons cannot yet be made, but the application of standardised data analytics to the University's online units in 2017 is expected to identify correlations between regular student engagement and eventual performance.

Discussion

Some real lessons can be learnt from the University's experiences; for example, the extent to which pioneer teams—with development assistance—have achieved by surmounting (unexpectedly challenging) administrative hurdles and developing and delivering engaging content to students from all university disciplines. There are positive outcomes for the staff too; by coming together to work in novel teams, they can share teaching experience and techniques, and identify new and otherwise improbable opportunities for research and collaboration.

In response to demonstrated planning and development needs, a new unit planning process has been introduced for all new (2016–) breadth units. Implemented as a team process, this anticipates design options and promises to improve content structure, consistency, and alignment (Linquist & Phegan, 2015). Early indications from reviews of units undergoing this structured development process indicate improved content structure and clearer alignment with intended learning outcomes and assessment components. The three 2016 units reviewed in early 2017 have resulted in outstanding student evaluation scores.

Development funding has been split into two phases with a tighter feedback loop to demonstrate progress to the Cross Faculty Learning and Teaching Committee. Administrative inconsistencies continue to emerge to challenge the siloed nature of the University systems, but communication with and amongst the faculties has improved as respective responsibilities are clarified. This includes faculty responsibilities in the continuing support of teaching teams in response to staff turnover—a faculty balance has to be maintained in compliance with the original unit development and delivery commitment.

As well as developing staff and student understanding of multidisciplinary approaches and collaborative problem solving, the breadth unit programme at the University has brought other benefits. By working in teams, lecturers have learnt from each other about online teaching methods that really work to address the implications of on-campus vs. off-campus study. Far from being concerned about the loss of discipline-specific content, professional accrediting bodies have, to the surprise of some academics, been very accepting of breadth units once they recognise the benefits for employability.

Lastly, and unexpectedly, the discipline of Philosophy is suddenly in demand; staff from other disciplines have recognised the unifying role philosophy can play in helping to reflect, and to integrate different perspectives into a single whole. As Graham Wood, one of the philosophers involved in the breadth unit programme, has explained:

> Wicked problems are called 'wicked' for a reason. They are not narrowly focused problems that yield straightforward answers. They are not problems that can necessarily be solved by the application of one methodology or understood within one conceptual framework. They do not neatly fit into physics, biology, or psychology. So philosophy, without being constrained by one disciplinary methodology or conceptual framework can engage with wicked problems in a way that may yield valuable answers. Another way to understand wicked problems is that they are essentially interdisciplinary problems. And … philosophy was interdisciplinary before there were any disciplines. That might go some way to explaining why philosophers are naturally at home in breadth units.
> (G. Wood, personal communication, April 8, 2016)

A number of issues remain to be addressed in ongoing study. Importantly, we might ask how we might evaluate the success of interdisciplinary subjects. Golding (2009, p. 22) argues that standard student survey instruments are not sufficiently specific, and should include an evaluation of the extent to which a subject enables students to develop a meta-disciplinary understanding and interdisciplinary skills. Are we achieving this by matching outcome achievement to graduate attributes such as problem solving and global citizenship? Further, how do we define what we expect of our students from their transdisciplinary understanding? Are we testing for the ability to recognise and notionally repeat differing disciplinary points of view, or for the ability to value and incorporate them in their own way of thinking (Millar, 2016)? How can a first-year undergraduate, with little or no understanding of their own home discipline, argue from its perspective and recognise arguments from other disciplinary perspectives? Do we expect different depths of understanding from different year levels?

Augsburg (2014, p. 240) asserts that transdisciplinary collaboration "involves mutual trust, personal chemistry, and a feeling of safety". How can educators successfully foster collaboration in a learning environment (especially in a one-semester online class)? And what transferability can be expected—and indeed accommodated—across the rest of a student's conventional undergraduate course? Do we know that exposure to breadth units improves student learning outcomes at the course or degree level? There is clearly a wealth of potential investigation ahead, and there are already many ripples across a university system arising from the introduction of breadth units (and the notion of transdisciplinarity) into the curriculum.

The breadth units discussed in this paper were all signed off with the explicit requirement that they be delivered fully online, so that students from across the University could access them regardless of location. In practice, many lecturers found online delivery problematic—they were far more comfortable delivering the units with a sizeable face-to-face component. More research is indicated, but regardless of whether delivery is completely online or blended (online and face to face), the University's desire to make breadth units available to all placed a focus on the challenges of both modes of delivery for the University's IT infrastructure and for staff.

Conclusion

This paper has focused on lessons learnt from the implementation of breadth units delivered online at a top ten Australian federal research university, as a way of indicating some of the challenges faced by universities when introducing transdisciplinarity into the higher education curriculum. Transdisciplinary studies are becoming a vital component of contemporary undergraduate education. At this University, breadth units that focus on complex challenges (or wicked problems) aim to make the central issues of our time fundamental (rather than secondary) to advanced discipline-focused university level study. Our experience suggests one should expect: (a) limited knowledge of leading-edge unit development principles and thus a need to develop competencies of teaching staff as part of the implementation process; (b) university systems governing finance, faculty workload, and student management information systems are not suited to transdisciplinary project requirements. However, these challenges are surmountable and the outcomes are inherently worthwhile.

In conclusion, our experience of implementing breadth units at this University bears out Tolkein's 2012, p. 161) observation that being "over the edge of the wild" does indeed mean you are "in for all sorts of fun wherever you go". However, particular successes of projects like this are two-fold. First, they provide a legitimate means by which to bring not only faculty staff but also the student body together so that, for example, students from medicine get to meet, interact, and study with students of art history; thus the silos inherent in the experience of higher education may be broken down. Second, the limitations that are exposed in the systems' infrastructure and teaching concepts and capabilities can be addressed as part of the implementation process to the benefit of the University; the system must be willing to evolve when embarking on the journey. In this respect there is, indeed, "nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after" (Tolkien, 2012, p. 69).

There is no question that the University has found things out about itself it was not expecting, but this has not in any way deterred it from moving forward. Such has been the success of the breadth unit initiative in opening up the academic narrative to rethink student learning outcomes, course relevance, course design, and unit delivery, that the initiative is now a catalyst for complete curriculum renewal. The principles inherent in breadth units will be integrated in all units of study, and will be built into entirely new course structures that focus on student choice and contemporary experience. "Depending on the degree chosen, students will be able structure degrees in such a way as to acquire greater depth and/or breadth, with more opportunities for multidisciplinary minors, global and local engagement, team-based learning and authentic experiential learning opportunities for students" (Sadler, 2016). In addition, the structured course and unit design processes will be based directly on those developed for the breadth unit programme, and the insights that have come from it. This new curriculum will roll out from 2018. That is to say, the findings reported in this paper have played a significant part in the University changing its entire educational model in the direction of breadth.

For a federal research-focused university to commit scarce resources to radically rework its teaching in such a way demonstrates the potential significance of transdisciplinary breadth for

the future of higher education. This paper has provided some insight into the processes and learning that led it to make such a momentous decision.

To conclude, perhaps the most significant outcome of transdisciplinary teaching projects, particularly those with a substantive online component, is that they take universities out of their comfort zones and encourage them to do something they require of their students—namely, to learn.

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