ROADBLOCKS, ROUNDABOUTS AND THOROUGHFARES: TWO PERSPECTIVES ON DESIGNING FOR CONTINUOUS INNOVATION AND SUSTAINABILITY AT TWO AUSTRALIAN UNIVERSITIES

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ABSTRACT

This paper presents a debate between the authors designed to articulate two different perspectives on designing for continuous innovation and sustainability at Central Queensland University and the University of Southern Queensland in Australia. One perspective, drawn from engineering and the physical sciences, conceives of innovation in terms of technology understood as applied science, with quantification and reduction essential precursors to effective optimisation. The other perspective, derived from education and the social sciences, understands innovation as transformation of practice (Denning 2004) and as contingent and situated and concerned with issues such as value and community.

The authors argue that both these perspectives are indispensable yet contradictory ingredients in the likely future composition and constitution of contemporary universities. On the basis of the application of these perspectives, there are as many roadblocks and roundabouts as there are thoroughfares in designing futures in and for these institutions. This finding suggests both the robustness and utility of the theoretical perspectives deployed and the need for an ongoing interrogation of what innovation is and whom it benefits and/or disadvantages. This is the approach most likely to contribute to genuine and productive sustainable innovation in higher education in the early 21st century.

Keywords: applied science, Australia, learning and teaching, transformation of practice, universities.

1. INTRODUCTION

Debate continues about appropriate ways of theorising the links between continuous innovation and sustainability. Much of the contemporary literature on innovation is based on deterministic models to the extent that they seek to identify causes or environments that generate innovation. An insightful characterisation is that "new ideas can be placed on a novelty continuum" (MacFadzean, O'Loughlin & Shaw 2005, p. 353). One end of the continuum, that of continuous improvement, is exemplified by Liker's (2004) description of the 14 point "Toyota Way", with its emphasis on continuous improvement and learning, process design and standardisation, of being "a very conservative company" (p. 42) and yet of having "the fastest [motor vehicle] product development process in the world" (p. 5) and of being "benchmarked as the best in class by all its peers and competitors throughout the world for high quality, high

productivity, manufacturing speed and flexibility" (p. 5). At the other end of the continuum is that of discontinuous (Bessant 2005) or disruptive (Christensen, Anthony & Roth 2004) innovation, often of "new organisations [using] relatively simple, convenient, low-cost innovations to create growth and triumph over powerful incumbents" (Christensen, Anthony & Roth, 2004, p. xv).

As MacFadzean, O'Loughlin and Shaw (2005) note, "Various definitions have been developed to explain innovation, and as a result, the term has gained greater ambiguity" (p. 353). However, a common theme is that of something that adds value to the product or service for the benefit of the customers or the shareholders. There is, however, a growing body of literature that suggests that the decisions made in practice are not logically aligned to such explicitly stated goals (Jameson & Hyland 2004a, 2004b; Kleiner 2003). Systems thinking theory (Ackoff 1999; Gharajedaghi 1999) helps provide a framework of multiple and influential stakeholders whose demands must be met to ensure successful change. Traditionally, staff members have been insufficiently brought into change, and Denning's (2004) focus on communities of practice seeks to address this imbalance. Toyota empowers workers by promising lifetime employment and by reducing the status and pay differences between staff and management. In a university, stakeholders include management, staff, students, the community and the government. The next stage of the problem is to empower stakeholders with insufficient voice, in particular students and the broader community.

There is clearly a link between these ideas of innovation – whether continuous, discontinuous or disruptive – and notions of sustainability. At a fundamental level, understanding sustainability as "The pursuit of long-term viability and progress of our business while taking responsibility for improving the environmental, social, and economic conditions resulting from our enterprise" (Genecor International 2002, n.p.) evokes the value and importance of engaging in ongoing innovation and improvement, while simultaneously attending to the impact of that innovation and improvement on the energising and life-giving elements, both within and outside enterprise. Sustainability emphasises the moral purpose and the ethical responsibility of innovation, and sets such innovation in a context that reaches beyond individual communities and organisations to nations, regions and the globe.

Within the broader perspective highlighted by this literature, this paper explores two approaches to conceptualising the links between continuous innovation and sustainability in two Australian universities: technology as applied science, whereby the various components of complex systems are understood as being in a rational relationship with one another, able to be simplified and understandable through stochastic analysis, and therefore ultimately manageable; and innovation understood as transformation of practice (Denning 2004), by which continuous change is sustainable if it is constructed as improved outcomes for various stakeholders.

This debate about innovation and sustainability is occurring at the same time as ongoing discussion about university governance and change management (Jongbloed, Maassen & Neave 1999; Renner & Cross 2003). Drivers of such change are external and internal to universities and constitute relentless pressure on those institutions to adapt and innovate in a context of unprecedented competition for students and funding.

The authors of the paper have been collaborating on research into several issues pertaining to higher education, and it has become apparent that the authors' different perspectives have significantly influenced their respective understandings of designing for continuous innovation and sustainability and their choice of concepts designed to

facilitate that design. The paper therefore explores two distinct approaches to innovation in different disciplines, with examples taken from teaching and learning practice at the authors' institutions, Central Queensland University (CQU) and the University of Southern Queensland (USQ), in Australia, to illustrate those two approaches. The examples also demonstrate how seemingly diametrically opposed viewpoints can actually be blended into a composite whole that allows the authors to propose a more nuanced and responsive understanding of designing for continuous innovation and sustainability than is possible from either approach considered in isolation from the other. The focus is therefore on using the two lenses to identify and evaluate these examples of teaching and learning practice in terms of their functions as roadblocks, roundabouts and/or thoroughfares in the ongoing processes of designing for continuous innovation and sustainability in two complex and diverse organisations.

2. DESIGNING FOR CONTINUOUS INNOVATION AND SUSTAINABILITY: TECHNOLOGY AS APPLIED SCIENCE

The engineering disciplines have evolved with a close link to the physical sciences, and have successfully exploited the methodologies of analysis and reduction to solve problems. Ackoff (1999), in describing the science of systems thinking, explains it as a development from the machine age characterised by the industrial revolution. The mechanistic view, characterised by management by objectives, was based on control theory, in that one established one's objectives and then established a control system, which consisted of a reduction to constituent parts, a feedback loop and a steering system. The feedback loop monitors whether one is on the right track, and the steering system makes corrections. CQU's (Central Queensland University 2005) quality management framework, for example, with its classic Deming (Garvin 1993) Plan, Do, Check, Act cycle exemplifies this model.

Engineering designs have evolved into a very clear and quantified process. At a macro level, instructional design applies the principles of reduction and control. What needs to be taught is broken down into instructional segments and tests and assessments form a feedback and control loop. At a micro level, however, there is a lack of recognised standards. For example, when designing the flooring for a building, an engineer would first establish the purpose of the building. There are established standards that specify the load bearing for different types of flooring use, such as office space versus warehousing. The engineer does not need to guess, or even research, a number of warehouses to establish a norm. If the engineer then decides to use reinforced concrete, for example, the engineer can again use standards to establish the strength of the concrete, knowing that during construction standards specify the optimum proportions of water, cement, sand and stone, that the method of mixing has been established and that quality control procedures will be in place to ensure that these standards are met. A teaching and learning equivalent would be a standard that establishes that to teach Boyle's law to a group of 30 first year students with a maximum Overall Position (the tertiary entrance score for Queensland school leavers) of 12 such that 80% achieve the ability to apply it will take two hours of lectures and one hour of tutorials. Experienced teachers intuitively have this knowledge. However, firstly we do not have a body of theory or recognised standards that are universally accepted that allow/s a neophyte to extrapolate this for a new course.

The implementation of referencing standards at contemporary universities is an excellent example of reduction and standardisation at work. Few would question the benefits of such an initiative. While at first the task of establishing consistency across

different disciplines is likely to be difficult, the degree of commonality is much greater than first thought. Just as the disciplines required to build ships and dams may seem different, the science is very similar (for example, fluid dynamics) while the standards are different.

The feedback and control loop of mechanistic systems is also clearly apparent in the performance measures set by government. Much of the management science of this period set the requirement for measurement. While the primary purpose of measurement may at first seem a means of establishing a control framework, it serves a much more fundamental and critical purpose – the process of measurement is heuristic. As Lord Kelvin states in relation to the physical sciences:

> I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of *Science*, whatever the matter may be. (cited in Thomson 1883/1891, p. 80; *emphasis in original*)

Measuring teaching and learning, or in this case the management of teaching and learning, advances these respective sciences. The critics who claim that we are measuring the wrong thing badly are quite right, but we fail if we simply sit back and criticise. We need to engage in the iterative process of improving the measures and thus increasing our scientific understanding of what we do.

The professions have traditionally transmitted knowledge through the apprentice system. With the advent of professional organisations, this has evolved into a hierarchy based on skills. This hierarchy is also a teaching and coaching hierarchy and, equally importantly, one of supervision and accountability. A member of the most senior conclave takes ultimate responsibility for every element of the product, whether it be a medical patient or the design of a huge dam.

In the school sector, it became clear some time ago that teaching requires a distinct set of skills in addition to substantial content knowledge, so that for example beginning teachers with Education Queensland are required to demonstrate a wide range of curriculum, pedagogical and assessment skills necessary to communicate that content knowledge to their students. CQU and USQ are recognising the importance of teaching skills, with the development of the Graduate Certificates respectively in Flexible Learning and Tertiary Teaching and Learning.

Universities have also evolved a professional hierarchy, and this hierarchy takes responsibility for supervision, coaching and accountability. However, this hierarchy was built for, and functions only in, research, not in teaching and learning. Another complication is that, with large organisations, a further set of skills is required – those related to management and administration. If we are to continue with hierarchical organisations, the individuals at the top of the hierarchy must either have all three skill sets (subject discipline, teaching and management) or be willing to acknowledge particularly weaknesses and be capable of seeking to appoint and of appropriately managing specialists in the areas in which they are personally less skilled.

However, the mechanistic model has some deep flaws. One such flaw is the tendency not to look at a whole problem but to focus on and solve parts of it (Ackoff 1999). A good illustration is the problem of student attrition (Somasundaram, Bowser & Danaher 2005). Up to half of the students who begin a program at a university do not complete it

at that university. The numbers are worse for minority students. About two thirds of this withdrawal is in the first year. Universities have therefore developed programs to reduce attrition, and they focus primarily on the first year. However, the problems can be better described as process wide, extending from our methods of recruitment to the placement of students, and solving the bottleneck at one point simply shifts the problem to another point in the process. As Moodie (2005) points out, Australia does well in English as a Second Language student recruitment and retention, but fails when these students try to obtain jobs.

A second weakness is that mechanical systems are mindless. Early management science was based on a single-minded control and decision-making system, such as a board of directors or a senior management group. This system assumed that such a group was or could be made to be altruistic and beneficent. However, as Kleiner (2003) points out, this does not happen. It is not that these people are corrupt, but rather that the system itself establishes an implicit consensus of "What is good for the king is good for the country".

A third problem is that real organisations, by contrast, are multi-minded, with people in all parts of the organisation making decisions and guiding the system (Gharajedaghi 1999). As de Certeau (1984) points out, there is a fundamental tension between strategies of marginalisation and tactics of resistance, from which it is possible to extrapolate that, unless the goals of individual workers are congruent with, or at a minimum not antagonistic to, the goals of the organisation, these individuals will partake in resistance. A typical example of this is that in universities administrative staff are not threatened by attempts to make the teaching process more efficient. Academic staff, on the other hand, fear the security of their jobs as well as the possibility of increased workloads. There is therefore a resistance of enquiry into staff–student ratios and of the implementation of processes that deliver higher versions of such ratios. Similarly, the recognition of teaching skills and management skills as being as important, if not more important, for senior academics is disturbing and deeply resented, sometimes consciously but often subconsciously.

To be effective, the design of continuous innovation and sustainability at universities requires two strategies. The first strategy is an open and fearless culture that not only recognises the interests of stakeholders but also is capable of dialogue, or more correctly a 'polylogue', by the stakeholders that can establish win–win or synergistic solutions (Covey 1990). The second strategy is an improvement not simply in the science of pedagogy but also in the technology of pedagogy, to the point where the profession establishes universally acceptable standards.

3. Designing for Continuous Innovation and Sustainability: The Transformation of Practice

According to Denning (2004):

> An innovation is a transformation of practice in a community. It is not the same as the invention of a new idea or object. The real work of innovation is in the transformation of practice. In this definition, community can be small, as in a workgroup, or large as in the whole world. A transformation of practice in the community won't happen unless the new practice generates more value to the members than the old. Value may not be economic; it may be pride, reputation, health, safety, freedom. Many innovations were preceded or enabled by inventions; but many innovations occurred without a significant invention. (n.p.)

This definition of innovation leads to an explicit focus on 'practice'. Practice can range from the explicit application of a set of skills to the habitual and unreflective customs of a group or organisation. Practice also denotes the *status quo* and received opinion about the most effective means of carrying out specific tasks. The proposition that 'practice makes perfect' suggests that practice cuts deeply into the contours of a group's or organisation's *modus operandi*, with the regular repetition of actions (and presumably thoughts) required to sustain that group or organisation.

Denning's (2004) reference to 'community' is also significant. It indicates that 'practice' occurs in a social context and setting, with opportunities for and the prospect of the heightened understanding arising from high level dialogue yet also for and of the negative impact of 'group think'. It resonates also with the idea of a community of practice (Wenger, McDermott & Snyder 2002), signifying a complex web of interconnected and interdependent actions and the establishment of commonly held mores and values.

The term 'value' features prominently in Denning's (2004) definition of innovation. Value evokes the idea of interests – the desires and goals of individuals, groups and the community at large. Value implies also that, although they might well be multiple and even competing, these interests are likely to be beneficent rather than malevolent in intent. Denning's insistence that "innovation won't occur if the community sees no value in the proposed new practice" (n.p.) suggests that 'value' in this context means the greater good of the greatest number of community members.

Denning's (2004) account of innovation also focuses on 'transformation'. This can be understood as 'making a difference' to the ways in which members of a community engage and interact with one another. As with value, transformation understood in this way has a positive valance; it is assumed that the changes that it brings about are beneficial to individuals and the community as a whole. Transformations can operate at varying levels of complexity and significance, and can endure for shorter and longer periods of time.

Finally, Denning (2004) argued that the way to facilitate innovation as transformation of practice was to focus on the interplay between organisational and personal processes. At the organisational level, he referred to "management values, rewards, prohibitions, encouragement of new ideas, encouragement of risk-taking, and the like" (n.p.). At the personal level, he noted that "Since changes to personal practices often entail personal discomfort", that was more difficult to teach "than the organizational aspects" (n.p.). He contrasted this situation with the more conventional approach to teaching about innovation, stating that "If all I do is teach creative problem-solving, I won't produce innovators" (n.p.).

Denning's (2004) reference to eschewing the teaching of "creative problem-solving" (n.p.) resonates with Introna's (1996) useful distinction between teleological (centralised and purpose driven) and ateleological (localised and organic) approaches to developing information systems and more broadly design processes. While contemporary organisations such as universities are likely to need to use both approaches, and although there are probably functional and dysfunctional manifestations of both approaches, it is important to keep in mind that at least one legitimate understanding of the design of innovation highlights relationships and values and is far less interested in forms and structures.

Denning's (2004) view of innovation articulates also with much of the contemporary theorising around postmodernity and postructuralism (Sarup 1993). The circulation of

counternarratives to contest and resist metanarratives, the subversion of marginalising and stereotyped binaries, the focus on meaning-making that is contingent, provisional and tentative, the links between the local and the global – all of these can potentially be included in the transformation of practices in communities. Indeed, researchers working in these intellectual spaces would be likely to assert that an invention that failed to engage with this kind of agenda would not qualify as an innovation.

What are the connections between these elements and extensions of Denning's (2004) conceptualisation of innovation and teaching and learning at CQU and USQ? Two examples must suffice of the transformations of practice from which those connections have been extrapolated. The first example relates to the management of and support for teaching and learning at CQU, and is the development of Webfuse, an online course management system devised to address the needs of academic and administrative staff members (Danaher, Luck & McConachie 2005; Jones, Luck, McConachie & Danaher 2005). Led by David Jones and involving a number of colleagues in the then Faculty of Informatics and Communication, this development began in 1997 and provided the major platform for that faculty's provision of online delivery to students since at least 2000, and was also used by staff members in other faculties. This development was also localised and responsive, in contrast to commercially available enterprise resource planning systems such as Blackboard and PeopleSoft. While users of Webfuse certainly had to learn some new skills, a major difference between it and the enterprise resource planning systems was that Webfuse was changed to accommodate the needs of its academic and administrative users, whereas staff members had to change their practices significantly to use Blackboard and PeopleSoft.

The second example relates to the equivalent management of and support for teaching and learning at USQ. The Generic Online Offline Delivery (GOOD) Project, which like Webfuse at CQU was developed locally at USQ, enables cross-media publishing from a single document source by means of a content management system and a content editing environment (Smith 2005). GOOD is implementing a single document source system based on the Extennsible Markup Language standard that is gradually being extended to areas such as the publication of course information and admissions and enrolment information. Furthermore, GOOD "provides an integral 'engine' for the provision of a range of e-applications, including e-Enrolment, e-Administration, e-Commerce, e-Publishing, and not least e-Learning" (Smith 2005, n.p.). It is the design of innovations such as GOOD that is claimed as the basis for USQ receiving such awards as joint winner of the Australian Good Universities Guide "University of the Year" for 2000-2001 and winner of the Commonwealth of Learning Award for Excellence for Institutional Achievement in 2004 (Smith 2005).

From these two examples have been distilled three major features of designing for continuous innovation and sustainability in teaching and learning at CQU and USQ. Firstly, the 'transformation of practice in communities' criterion of such innovation articulated by Denning (2004) was undoubtedly fulfilled in both examples. Both Webfuse and GOOD were designed with specific communities of practice (Wenger, McDermott & Snyder, 2002) in mind, and both of them were located in those communities and were modified as a result of that location. Secondly, both developments added value to, and helped to fulfil the interests of, large numbers of members of those communities. Thirdly, both development teams acted to a large extent on their own initiative in developing the innovations; they received varying levels of official support at different times, but they were clearly the prime movers in identifying a significant teaching and learning need and responding to it.

There are in turn three key implications of these three features. Firstly, if innovation in teaching and learning is to be designed at CQU and USQ, decision-makers must identify and celebrate the wide diversity of communities of practice that constitute both organisations. That diversity derives from and reflects each institution's complexity, and it must be matched by a respect for diversity in approaches to curriculum, pedagogy and assessment. Secondly, resources must be allocated to recognising and researching the values and interests of those multiple communities. It might be appropriate, for example, for the universities' teaching and learning management plans to be distilled from a synthesis of those values and interests, and for resources to be allocated accordingly. Thirdly, the organisation must find ways to encourage and reward the work of individuals and groups who take initiative in developing these kinds of innovations. This entails the facilitation of ateleological approaches (Introna 1996) to decision-making at all levels of the institution.

4. Debating the Two Perspectives on Designing for Continuous Innovation and Sustainability

There are several points that could be made in relation to the points of divergence between the two perspectives on designing for continuous innovation and sustainability outlined above. Attention is given to four questions that encapsulate many of the principal elements of both perspectives and that in combination entail several kinds of roadblocks, roundabouts and thoroughfares:

- What is innovation in teaching and learning?
- Which views of knowledge underpin different perspectives on innovation?
- Which views of contemporary universities underpin different perspectives on innovation?
- How can innovation in teaching and learning be designed most effectively?

In this section of the paper, the intention is to delineate the main differences between the perspectives; the conclusion takes up the extent to which some kind of convergence between them is feasible and desirable.

What is innovation in teaching and learning?

The view of innovation derived from engineering and the physical sciences and directed at technology as applied science is in large measure linear, sequential, rational and technical. It is also predicated on identifying and solving problems and correcting faults and non-compliances. A key assumption is that innovations fulfil the needs of particular stakeholders, and that such needs can readily be made explicit and known. This view of innovation has many of the features of a teleological approach to systems development (Introna 1996).

By contrast, Denning's (2004) view of innovation as transformation of practice is highly ateleological and explicitly eschews a focus on problem solving. It is also non-linear and non-sequential and opposed to rationality and technicism. Instead it highlights the contingent, organic, situated and unpredictable character of innovations located in particular communities of practice, with all the attendant complexities and nuances.

Which views of knowledge underpin different perspectives on innovation?

These different perspectives on innovation are underpinned by divergent views of what knowledge is and how it is constructed and communicated. Innovation understood in

terms of technology as applied science tends to derive from a view of knowledge as objective, permanent and static, amenable to measurement and quantification and impervious to cultural and geographical differences. This view also assumes that all relevant information in identifying and solving a problem can be known at the outset, and hence that the plan for the innovation once conceived must be implemented without deviation or interruption.

Innovation understood as transformation of practice emphasises instead knowledge as contingent, interested, partial, subjective and tentative, and also constructed in and by particular communities of practice and in different spatial and temporal contexts. Knowledge therefore varies according to the respective positions and perspectives of individual knowers. It follows that the implementation of an innovation is likely to experience a multitude of 'stops and starts' as various stakeholders are consulted about whether their needs are being met and whether the innovation adds value to their practices.

Which views of contemporary universities underpin different perspectives on innovation?

These different perspectives on innovation and these competing views of knowledge are closely associated with contrasting beliefs about the purpose and significance of contemporary universities. Innovation conceived as technology as applied science and viewing knowledge as objective and static is likely to be linked with a construction of universities as politically neutral 'level playing fields' accessed by those with the ability to complete higher education. These constructions in turn are increasingly connected with a focus on the quality assurance of university procedures and the publication of 'league tables' comparing individual universities in relation to certain prespecified and 'objective' performance indicators.

On the other hand, innovation as transformation of practice and knowledge as subjective and dynamic tend to be aligned with a view of universities as complicit with the current dominant interests in society, sometimes countered by a conviction that universities can and should be the site of resistance and transformation of those interests. Adherents of this view perceive quality assurance and league tables as mechanisms of control and surveillance, and as a means of entrenching the privileged positions of elite universities at the cost of the sustainability and viability of universities serving more marginalised communities.

How can innovation in teaching and learning be designed most effectively?

Finally, these different sets of views coalesce around divergent beliefs about whether and how innovation in teaching and learning can be designed. Innovation understood in relation to technology as applied science probably requires greater agreement than is currently the case about what learning is and how it is facilitated. If such agreement were forthcoming, it is likely that the design of a particular innovation would be carefully planned and implemented in a series of stages, perhaps with a trial study with a small group of users to be followed by progressive implementation across all relevant sections of the organisation. This design might well be accompanied by a strategic plan listing intended outcomes and performance indicators and a subsequent formal review and evaluation of the effectiveness of the innovation's design.

The design of innovation as transformation of practice, true to its ateleological framing, is perhaps most effectively 'caught, not taught'. That is, members of the community of practice working at different tasks would be most likely to learn about, learn to use and

adopt as their own practice an innovation *in situ*, because they respected and trusted the individuals designing the change and also because that change made sense in the context of their roles and responsibilities and enabled them to discharge those roles and responsibilities more efficiently. Implementation and evaluation would likewise occur *in situ*, as members of the community were given the space and the time to reflect individually and collaboratively on the benefits or otherwise of the change.

5. CONCLUSION

Like other contemporary universities, CQU and USQ are directed to implement a number of complex and potentially contradictory agendas and initiatives:

- Quality management
- Key performance indicators
- Market economics
- Flexible teaching and learning
- Generic skills and graduate attributes
- Predictive Independency Model.

All these agendas and initiatives are well recognised and have significant followings. However, in combination they represent considerable confusion – and hence potential roadblocks and roundabouts – in relation to designing for continuous innovation and sustainability in university teaching and learning. The expected results – the benefits and the costs to the different stakeholders of implementing these initiatives – are not clearly understood or articulated. The interactions among these initiatives are even less well understood. Faced with this plethora of directions, there is an understandable tendency to shut down, to refuse to engage with the implementation at the level that creates the cultural integration that represents Denning's (2004) standard of success.

That complexity and potential confusion resonate with the debate presented in this paper. That debate between two different views of innovation – one focused on technology as applied science, the other as transformation of practice (Denning 2004) – has elicited a number of significant issues relating to the design of such innovation in teaching and learning in contemporary universities. These issues include diverse understandings of knowledge construction and communication and varied assumptions about the purpose and significance of those universities.

At one level, the debate has been a useful device for assembling evidence in favour of the concluding argument presented here: that both sets of ideas characterise, and are necessary for, potential thoroughfares in designing for continuous innovation and sustainability in university teaching and learning. That is, improvements in teaching and learning that are effective and sustainable need to be accompanied simultaneously by a carefully planned and systematic approach and an attentiveness to the complex and sometimes competing needs of multiple stakeholders and members of communities of practice. In a sense this approach assigns equal and synchronous priority to the 'macro' and 'micro' dimensions of educational change in universities, and is therefore likely to be more effective, nuanced and responsive than if the two dimensions were addressed separately.

At another level, it is important to note that there are significant limits to the conceptual and methodological pluralism implied in the preceding paragraph. While it is true that

there is value in seeking convergence between the two views of innovation, knowledge and Australian universities, the differences between them are also valuable, because they evoke largely contradictory assumptions about the current and future effectiveness of such universities. There is considerable danger in efforts to synthesise the two views that the ateleological counternarrative might be consumed and subsumed by the teleological metnarrative – largely because that is what metanarratives do if they want to survive and endure.

In conclusion, then, this paper's particular contribution to the focus on designing for continuous innovation and sustainability in teaching and learning at CQU and USQ is the articulation of an uneasy truce between two different views of such innovation and its design. The universities' students, staff members and other stakeholders will be best served if that truce is accompanied by an ongoing interrogation of innovation: what it is, whom it benefits and/or disadvantages and whether, with whom and how it should be designed. Only then will the thoroughfares be facilitated and the roundabouts and roadblocks minimised.

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