

Whither e-learning? Conceptions of change and innovation in higher education

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Abstract

E-learning, as an innovation, has been associated with radical change, but many of the accepted organisational strategies for managing such change have failed to deliver the expected benefits and advantages. There is a pressing requirement to understand better the nature of e-learning, as an educational innovation, and to evolve contextually derived frameworks for change which align with organisational culture and practice. This paper proposes a processual change framework for embedding e-learning, derived from a longitudinal study of four Australian universities, each adopting a different approach to implementing e-learning across their respective institutions.

Keywords

innovation
organisational change
higher education
creativity
e-learning
complexity

1. Introduction

In the higher education (HE) sector and beyond, e-learning has often been associated with radical change and attributed with introducing significant and far reaching disruptions into almost every facet of university life (Spender 2002). This position is, however, contestable with contradictory evidence suggesting that, at best, the impact of most change associated with e-learning so far has been incremental (Salmon 2005) and, at worst, e-learning has been a failure (Maslen 2004; Zemsky and Massy 2004). It is tempting for both innovators and detractors alike to tag as radical any new idea or initiative introduced into an organisation. Radical innovation in an organisational context, for example, can be associated with both bold and essential change or with risky and expensive effort. Two key questions are, therefore, 'What do we mean by radical innovation?' and 'Why is it important to distinguish between radical and routine innovations?'

2. Is e-learning a radical innovation?

Definitions of radical innovation and change focus on processes which require the development of completely new routines, norms and values within an organisation (Nord and Tucker 1987), establishment of new technology, products or functionality (Betz 2003) and change which leads

to transformation of existing industries or markets, or the creation of new ones (Leifer et al. 2000). Leifer's definition of a radical innovation as 'a product, process or service with either unprecedented performance features or familiar features that offer potential for significant improvements in performance or cost' (Leifer et al. 2000: 5) highlights the newness, novelty and scale of performance improvements or economic efficiencies and is useful in the context of a discussion of e-learning.

Incremental innovation on the other hand emphasises cost or feature improvements, without necessarily altering functionality and relies on competencies in exploitation (Betz 2003; Leifer et al. 2000). The change processes are evolutionary and more akin to a slowly adapting ecology than a fast moving and driven endeavour.

The second question, in asking why it is important to distinguish between radical and incremental innovation, seeks to explore the impact of the two on the development, implementation and progression of e-learning within universities.

Radical innovation introduces significant discontinuities or disruptions into a system, requiring the development of new skills' sets and competencies (or the significant enhancement of existing ones) and the abandonment of some old capabilities or practices. This may, or may not, sit comfortably or align with the existing organisational business, culture, or its teaching and learning practices. It also typically originates at the periphery of an organisation, far from the core business centre (Farrell 1994; Hanna 2003) and develops within the 'white space' which exists between an organisation's established businesses, or outside its current strategic context (Leifer et al. 2000: 6–7). This isolated location can present disadvantages, for example, when an individual or project team has significant deficiencies in knowledge and skills but is unable to access broader mainstream resources held by the organisation. Remoteness also minimises opportunities for the wider organisational cross-fertilisation and dissemination, outcomes which prepare a foundation for wider implementation of the innovation and helps to establish its organisational legitimacy.

Radical innovation is marked by uncertainties, conflicts, risks and knowledge gaps, and, as such, the development process is invariably non-linear, sporadic and stochastic and the outcome unpredictable and highly context-dependent (Leifer et al. 2000). The more radical the innovation, the more complex and the more difficult it is to control:

Management of radical innovation projects . . . remains more of an art than a science. Because radical innovation projects are faced with high uncertainty on multiple dimensions, the sophisticated management tools that work so well in the incremental innovation environment are not adequate

(Leifer et al. 2000: 55)

Incremental or evolutionary innovation, on the other hand, tends to follow a more predictable and orthodox management pathway with respect to

funding, organisational sponsorship, development and commercialisation (Sahal 1981).

Some administrators and researchers treat the radical/incremental variable as if it were a dichotomy (Nord and Tucker 1987). But the organisational tension between these two extremities can be detrimental: 'The danger . . . is that we expend all our resources on extrapolating and sustaining our current portfolio and not nearly enough on new initiatives. The result is that tomorrow is neglected to sustain today' (Salaman and Storey 2002: 155).

There is a strong case, therefore, to seek a balance along the radical/incremental continuum, nurturing the capacity to manage the slow evolutionary processes, along with the rapid or extreme, the continuous with the discontinuous, and to extrapolate the organisational knowledge enhancement and the competency-destroying elements associated with both evolutionary and discontinuous forms of innovation. Tushman et al. describe organisations with this ability as 'ambidextrous', and as possessing 'multiple organizational architectures to concurrently nurture these diverse innovation requirements' (Tushman et al. 1997: 6).

The extent to which an organisation, such as a university, understands the generic characteristics and processes associated with innovation, as well as the particular attributes of e-learning as a specific form of innovation, is critical in assessing its internal capacity to transform and to embed e-learning.

3. Dimensions of e-learning

This paper posits the following dimensions of e-learning to assess the 'radicalness' of an innovation:

- use of communication and information technologies (CITs) to mediate and enhance teaching and learning,
- contextually derived conceptions of quality,
- infusion of creative and innovative elements into teaching and learning.

3.1. Use of communication and information technologies

The use of technology as an educational aid is not in itself new or radical. As was the case with many previous educational innovations (resource-based learning, distance education and educational television) much of the focus of early e-learning initiatives was on technology (Holt and Thompson 1995; Taylor et al. 1996). However, the use of new CITs to enhance, mediate or even enable learning has proven to be both radical and challenging for teachers, learners and administrators.

Typically e-learning has exploited newer electronic and digital technologies (Internet, web, enterprise level learning and content management systems, virtual environments, podcasting and mobile technologies) with the laudable aims of harnessing technology to address issues of access, quality, support, scalability and efficiency. Latterly, reusable objects

from digital repositories have been promoted, a concept built on the pedagogy of the resource-based learning model (McNaught et al. 2000). This approach, however, presents both an opportunity and a future dilemma: 'while we can atomise knowledge into elements such as "learning objects", we must recognise that they are there to be shared, contextualised, and negotiated in the social context of the online community of practice' (Laurillard 2003: iii).

Technologies that enable or facilitate collaboration and communication have a key role to play in the next generation of the e-learning innovation. Of particular note, are the 'Web 2' technologies which recognise the need for the human touch in environments, enhancing personalisation or telepresence (that is the sense of 'being there'), and extending the imagination and capacity to invent creative spaces.

A notable trend associated with the innovation of e-learning has been the relentless advance of technological complexity. These developments have included technologies which increase the level of synchronous and two-way communication; use of media-rich technologies including high definition video, simulation and 3D immersive environments; podcasting, wireless, mobile and satellite technologies, which enhance access and flexible learning options (Peters 2005). Associated with the latter is the proliferation of handheld devices, mobile phones and other wireless technologies, providing students with immediacy (though not yet necessarily quality) of access to e-learning resources, information and activities.

The technologies underpinning the next generation of e-learning will offer individuals an alternative to the practice of learning in isolation, engaging with communities of learners in small groups or partnerships. It is, nevertheless, the relative paucity of creative learning designs and experiences associated with the current form of e-learning that has contributed to criticism about e-learning and its limited application in higher education.

A pertinent question which lingers, however, is 'Have we successfully applied the use of advanced technology in such a way that it has brought about a significant shift in our conception of the teaching and learning process?'. The general consensus is not yet. At least not at a scale which offers the majority of learners opportunities to develop and engage with creative and inspiring content, referred to as 'the democratisation of creativity' (Spender 2002: 24), or which places the locus of control in the hands of the learner, rather than the teacher.

And a final question is 'Has the "technology" capability dimension of e-learning been embedded in HE practice and ideology?'. Despite the advances of Web 2, again the answer is not yet, for it can be argued that there are few examples of sustaining truly exceptional use of technology in universities. If widespread and sustained use of this type had occurred, one might expect more evidence of qualitatively different and enhanced learning experiences and outcomes. Quality, therefore it is argued is a contextually derived dimension of the e-learning innovation.

3.2. Quality

A considered and mature understanding of the conception of quality is required with respect to e-learning and its adoption in HE. The discourse has revealed the contested nature and the multi-dimensional practices which centre on notions of quality. These, however, may be seen to cluster around certain themes or value systems: standards, indicators of excellence; and organisational 'fit' or alignment with purpose. Much of the debate exposes issues of control or empowerment.

3.2.1. Quality as standards

The first conceptual cluster of ideas about quality centres on agreed processes, standards, measurements and controls, embracing a view of quality which accentuates elimination or minimisation of errors. This approach has underpinned many of the Australian HE distance education production methods (National Board of Employment, Education and Training 1992) and has found similar advocates more recently with respect to e-learning (Baker 2006).

Recognised standards typically provide a framework or checklist against which one seeks to assure quality to various individuals or stakeholders through continuous improvement, benchmarking and other process measures. The standards and tools adopted include ISO (International Standards Organisation) 9000 as well as more contextually derived standards, such as the British Learning Association Quality Mark, which focuses on areas specific to quality in learning and development.

Convictions as to the importance of quality frameworks, standards and benchmarks have underpinned an international debate about e-learning, within the context where the globalisation of education markets requires assurances about quality programs (Skilbeck and Connell 2000). Notwithstanding the usefulness of such tools to enhance learning, there is a lingering concern held by some that standards and benchmarks can be promoted as the primary determinant of quality to the detriment of individually derived notions of excellence.

3.2.2. Quality as an indicator of excellence

Within the HE sector, particularly the traditional universities, quality has been conceived as an indicator of pre-eminence or excellence. For example, quality teaching and learning has been understood as the 'ultimate', when academic staff have relied less on a set of institutionally derived measurements about the inputs and processes of a teaching program and more on the quality of the outputs of the program, the learning outcomes and graduate attributes (Robson 2002).

The focus of this conception of quality is on empowerment of the teaching staff, where there is a vested interest in equating quality with the professionalism that accompanies both the academic and the specific discipline culture ascribed to by that member of staff. There is, therefore, a strong allegiance to the notion of quality teaching related to a specific discipline expertise.

3.2.3. Quality as an alignment of organisational values

The third conception is a variation or extension of the excellence theme where quality is perceived as alignment with organisational context and purpose. Proponents of this view argue that quality is contingent on, or relative to, the goals and values of a particular organisation. The organisational contextual fit is paramount, and therefore the level of quality can be gauged only through specific institutionally constructed measures that assess the extent to which the organisational mission or purpose has been met.

University executives and management, for example, identify elements of the teaching and learning environment that focus on quality and e-learning from a perspective of improving or enhancing the institution's current educational practice and profile. Quality must be assessed as 'fitness for purpose', but issues can arise if there is not a common and well-articulated institutional vision about an innovation such as e-learning. Various quality agendas and schemas, however, may percolate up from different faculties, departments or service areas. Teachers, for example, may emphasise pedagogy and the quality of learning as the crux of e-learning standards, whereas administrators and policy makers may hone in on efficiencies and processes as a measure of quality, within the contemporary climate of scarce resources and massification of the HE system (Taylor et al. 1996).

3.3. Infusion of creative and innovative elements

The imperative for organisations to innovate and 'to become inventive in all aspects of their operations and management, if they are to survive and thrive in the new economy' (Leavy 2002: 70), lies at the heart of what is referred to as the 'creativity advantage' (Kao 1997). Creativity is essential to the innovation process, but in the drive to embed e-learning, many universities have failed to acknowledge the vital role it plays in the teaching and learning process, 'these devices grow organically They begin life in the excitement of creativity and the intention of doing something different. That is how new teaching designs should begin' (Laurillard 2002: 24). Conceptions of creativity are diverse, but not amorphous, as it entails more than a flash of inspiration from someone who has never worked in a field, (Von Stamm 2003). A key message for educational administrators, therefore, is that creativity is about ' . . . relating a concept to a particular body of knowledge. The existing body of knowledge is as vital as the novel idea and really creative people spend years and years acquiring and refining their knowledge base.' (Hunt 2003 quoted in Von Stamm 2003).

The worry for many administrators is that creative processes are messy and difficult to manage. Creativity introduces tensions into a system which has grown to focus on targets and schedules as the cornerstones of good practice. However, if we are truly seeking excellence and if e-learning is to realise its potential in making qualitatively different enhancements to learning, then universities and the HE sector as a whole, must develop the

capacity to infuse creative processes into educational practice as a means of generating new order. As Stacey argues,

Contrary to some of our most deep-seated beliefs, mess is the material from which life and creativity are built and it seems that they are built, not according to some overall prior design, but through a process of spontaneous self organisation that produces emergent outcomes

(Stacey 2000: 294)

Tierney (1999) links innovation and creativity to quality outcomes and high performance, a position which resonates with those who promote values of 'excellence through diversity' rather than standardised models of quality assurance or best practice as the drivers of the next generation of e-learning. In this latter context, Tierney and McInnis (2001, online) argue,

'A system that encourages creative activity is not one that rewards all institutions similarly and sets mandates and targets In a high performance system a governing body focuses less on preventing bad things from happening and more on making good things happen'.

The next generation of e-learning, to enable a transformation of the learning experience, must deliver far more than just another wave of technological invention. Rather it requires the holistic maturing of the innovation concept in ways that entail the identification, development and integration of its multiple constituent facets: pedagogy, theory, technology, assessment, administration, commerce, legislation, creativity and research, and at all levels of organisational granularity. A new framework for change is required to embed e-learning, a more mature but radical framework which acknowledges organisational business drivers but also the need to embrace innovation and its inherent complexities.

4. What is the embedding framework?

The embedding framework presented in this paper offers a processual model which was developed as part of the author's doctoral thesis, drawing on a longitudinal and detailed case study of four Australian universities from 1998 to 2004 (Rossiter 2006). The universities studied occupied specific geographic and strategic positions within the HE sector and represented: a geographically distributed distance education university, an established research strong university, a regional multi-campus distance education university and an urban university of technology.

Two primary phases of change are associated with this framework: an initial innovatory phase followed by an embedding phase. The phases are further divided into three domains: the Product-centric Domain, the Business Domain and the Complex Domain.

The first two domains, the Product-centric and the Business Domains, are characterised by a number of experiences, attributes and processes

which are relatively familiar to HE institutions, but the third Complex Domain presents some new, and perhaps challenging, concepts.

4.1. *Product-centric domain*

The driving force of the *Product-centric Domain* is the production of an innovative 'product', such as a new e-learning module or the re-purposing of an existing course for online delivery. Development activity is typically driven by an enthusiastic individual or a small team, usually located within the same department or discipline. As such the characteristics of the e-learning innovation tend to have a specific discipline or distinctive professional focus, but in the wider organisation there is a lack of clarity or shared understanding about the nature of this innovation. The innovation of e-learning, therefore, is open to many different interpretations. Quality, for example, as with traditional forms of teaching, is mostly left to the professional judgement of an individual, and often assessed by a discipline-centric rather than an institutionally derived set of criteria.

In these early stages the e-learning innovation tends to be small in scale and relatively self-contained within its own system boundary, having minimal interaction with other elements in the system. Management oversight is low key, there are few institutional interventions and the organisational response is typically 'laissez-faire' with few, if any, specified or targeted policies or processes in place to manage or guide these 'lone ranger' (Bates 2000) type projects.

A common attribute, associated with the innovation during this phase is the sense of creative energy and enthusiasm associated with its development, aligning with the highly individualistic nature of traditional teaching practice. But while an innovation in its initial start-up may have an organisational champion, it is likely to be competing with other innovations within the same research and development space. Many young innovations therefore do not survive this competitive phase, which is typified by the 'thousand flowers bloom' culture apparent in many universities.

If, however, an innovation survives this early experimental or innovatory phase, it has usually attracted new disciples, gathered some momentum, grown in scope and ambition, and begun to move towards the organisational centre. Support for the innovation can be garnered through short term alliances and coalitions of key players, and occasionally through collaboration, or merging of projects. The timeline for this phase can vary, reflecting either an evolutionary or a revolutionary change process, but typically the phase is characterised by fairly rapid growth spurts, as a number of new ideas and practices emerge and gain wider acceptance.

4.2. *Business domain*

The point where the locus of control or ownership for the e-learning innovation moves from the individual to the institution marks the transition from the Product-centric to the Business Domain. The shift is prompted by the need to move the innovation into wider circles of influence, to seek

alignment with other organisational agents and to manage interactions with other stakeholders. The transition to the Business Domain is not a clearly defined point in time, but occurs progressively with the greater awareness and recognition of the innovation across the organisation. Significantly it attains a critical mass of users and is clearly now a mainstream, rather than a peripheral, activity permeating the organisation both laterally (across faculties, divisions and departments) and vertically (down the organisational structure to reach the individuals therein).

As the innovation gains momentum during this phase institutional interventions are applied to guide its development. In the Australian universities studied, the types of institutional interventions introduced included setting of online course adoption or usage targets; introduction of innovative grant programmes and collaborative institution-wide projects; policies to establish frameworks for quality or copyright ownership; staff development programmes and promotion schemes. For example, the mandated use of online templates as a quality control mechanism was introduced to establish control and order, with a view to long term stability, into what had been seen as an unruly or unchecked experiment. There emerged therefore in the Australian sector, and internationally, a shift from autonomous and creative activity to systematic, controlled or directed change which had its expression in uniform institutionally defined standards and benchmarks (Hannan and Silver 2000).

Conformity does produce consistency and a more common understanding of the e-learning innovation does emerge amongst its constituents. However, as organisations assume greater control through process interventions and the focus of change shifts towards business activity, tensions arise between the original 'owners' (the e-learning innovators) and the university. This is exacerbated by the fact that the administration and the responsibility for future development of the innovation has been transferred to managers and e-learning professionals, typically located in central units rather than at the departmental coalface. This small group of disaffected staff, including later adopters, resisters, or newly emerging innovators, tends to cluster or congregate in an organisational 'moat' which lies between the space occupied by the majority, which houses mainstream 'legitimate' activity, and the extremities of organisational activity at the institutional boundary.

Nevertheless, e-learning in this phase has achieved a mission critical status and, as such, a high degree of organisational legitimacy, enabling it to compete successfully with any new challenging innovations. The driving force behind, and the language associated with, e-learning has a business focus, with return-on-investment, market needs, consistency, efficiencies and economies of scale adopted as key criteria to assess the effectiveness of the innovation. Quality assurance standards in Australian universities, for example, dictated a plethora of institutional processes.

The defining characteristic at this stage is a desire for organisational coherence, stability and standards (Salaman and Storey 2002) which

align as closely as possible with organisational mission. It is not surprising, therefore, that during this phase, some stakeholders, particularly the executive and managers, adopt the view that the e-learning innovation has been fully 'institutionalised' (Armenakis et al. 1999) or embedded. There is considerable evidence, however, which challenges this stance as evident in the next complex change phase.

4.3. Complex domain

The Complex Domain evolves from the necessity of the innovation to move beyond the physical and intellectual constraints of the Business Domain, to be rejuvenated by the injection of new ideas and energies and the fusion of newer, but complementary, value-adding innovations.

The nature of the e-learning innovation, its shape or organisational footprint, is very different, having undergone significant internal adaptations and changes. The innovation itself remains relatively large in size and therefore organisational issues are less about rapid growth or uptake, as was evident in the first two domains, and more about a change in shape and adaptation. The normalisation and uniformity which characterised e-learning during the Business Domain at times held back useful enhancements and development. But now, since the innovation has largely achieved maximum penetration in usage, the focus in this domain is on achieving value on investment through quality and efficacy.

In the HE sector, quality demands more than quality assurance processes – it is frequently conceived as excellence which emanates from the capacity to embrace the creative and incorporate the serendipitous (the 'ah' moments). This is not a case to jettison many of the gains achieved in the Business Domain through sound design, sharing of best practice and benchmarking for they can form the building blocks for creative thought and regeneration of the innovation. The next generation of e-learning is now poised to embrace a much greater diversity of ideas, practices, delivery modes, technologies, learning theories and design. Indeed the very role of teacher and student is subject to reassessment and challenge.

The key consideration in this phase is 'What is the appropriate organisational response?'. The initial evidence suggests that it is populated by new uncertainties and contradictions about the nature or value of the innovation, reminiscent of the Innovation Phase. The difference, however, is that organisations in the Complex Domain have attained a stage of maturity where anomalies or tensions can be tolerated, even welcomed, rather than seen as threatening to the very existence of the innovation.

The challenge, nevertheless, is to be able to manage simultaneously, the radical, routine and evolutionary dimensions of e-learning innovation, while building in processes which permit expression of newly emerging creative elements. Managing the creative tension which flows from intersecting ideas and opposing views within the organisation requires exceptional leadership, managerial flexibility and organisational maturity. HE

institutions will need to recognise and foster again the processes that accommodate and facilitate intuition, adaptation and creativity but within a framework that clearly supports a corporate strategy and agreed business processes.

The Complex Domain is characterised by iterative transitions and interactions, both ordered and non-ordered, between the multifarious system elements, entailing complex, self-organising processes (Boisot and Child 1999; Stacey 2000). Thus events and activities in this Domain cannot be tightly controlled by managers. Furthermore an over-reliance on formal structure, process and interventions to drive e-learning (e.g. policies, adoption targets, incentives) anchors the innovation discourse at a lower level of conceptual sophistication, so that, from a pedagogical, learning and organisational efficacy perspective, the real potential of e-learning remains elusive.

As the transition to and movement within this third domain is highly malleable and iterative, one might expect to see a greater awareness of and institutional ability to harness self-organisation and co-evolution processes, fundamental principles of complexity theory (Axelrod and Cohen 1999) in order to maximise the potential benefits from a new invention. In some respects these fresh new ideas pull the e-learning innovation again towards the organisational periphery, towards the edge of chaos (Lewin 1999), or into the space of bounded instability where regeneration can occur.

The primary responsibility of the organisation, therefore, is to ensure that these competing tendencies and system instabilities do not destroy the innovation. A key leadership attribute is to strike an appropriate balance: to be able to retain the benefits and lessons learned from the earlier phases, the useful policy frameworks and systems functions (De Freitas and Oliver 2005), but to avoid the tendency to smother or to disenfranchise the new fledgling creative elements. Allowing uncertainties and even tensions to exist, but not dominate, is an essential strategy associated with complexity absorption (Boisot and Child 1999). It requires considerable insight and flexibility from leaders and managers, as the natural tendency appears to be to control or micro-manage new developments.

5. How does this lead to transformation?

Organisational transformation is about significantly different, substantive and long-lasting change (Kotter 1995). To achieve this there must be evidence of embedding through usage, integration, legitimisation and sustainability. However, is it valid to claim that embedding, and therefore transformation, can be achieved simply by removing the barriers and inadequacies which have impeded organisational change? Organisations, it is argued, need to be far more proactive, adopting a suite of strategies to enable transformation for 'Just as IT has transformed the context of teaching and scholarship without transforming either teaching or scholarship itself, so has IT transformed higher education without transforming the places that set the standards for education' (Ayres and Grisham 2003: 42).

6. Organisational strategies to enable embedding

A number of principles and objectives, underpinned by strategies and methods, might be employed to embed e-learning and facilitate organisational transformation.

The ultimate goal is to create a system environment which cultivates the appropriate conditions to ensure co-existence and co-evolution of both complementary and apparently contradictory agents and elements, such as creativity and conformity, order and disruption, collaboration and individualism. The aim is to achieve an overall and acceptable level of system balance over time, but not necessarily to strive for system equilibrium at all times. What, however, is acceptable? This must be a contextually driven assessment and the organisational decisions flowing from it must be underpinned by bold leadership and sound management, which derives from judgement as well as policies and procedures. There is an imperative, therefore, if institutions such as universities are to acquire a mature conception of e-learning, to ascribe more weight in decision making to the human attributes of personal judgement, creativity, trust and experience.

In the Business Domain the pressing need was for clarity, which at times led to a conviction which emphasised certainty, uniformity and at times rigidity. In the Complex Domain, the need is to build organisational capacity and tolerance of fuzziness and system complexity and to maximise the creative energy flowing from organisational tension. The new strategy must incorporate and build on core business processes, but a more flexible and participatory decision making approach is required, placing less emphasis on controlling and routine mechanisms and more on motivational incentives.

Leaders and managers need to actively promote and sustain collaboration and knowledge sharing, to enable small, isolated and ineffectual innovations to grow into effective, scalable and sustainable e-learning systems.

7. Conclusion

The next generation of the e-learning innovation is likely to be populated with many instances of intersecting forces or trajectories, some of which have been described above. The ability to embed e-learning in a university context assumes a relational and holistic knowledge of the diverse but interconnected elements of the university as a system and a deeper understanding of the dimension of radicalness with respect to innovation. The HE sector has witnessed radical structural, technological and process change, but as yet it has not engaged adequately with the innovation of e-learning at the epistemological level, as cogently expressed by Laurillard (2003: iii): 'When the knowledge technologies change so radically, they change not just what we know, but how we come to know it'.

The issues which will present the greatest challenges are those associated with the interface of human and social expectations of educational innovation, such as the ability to fuse formal, work-based and informal learning dimensions into a cohesive, personally and socially relevant experience. E-learning's relevance will derive less from its capacity merely

to 'deliver' at any place or any time, and more from its willingness to create learning opportunities and experiences that reaffirm the humanistic and socially contextual dimension of learning, although the latter will be concomitant with the former. The nature of the organisational responses and the change processes which underpin this type of innovation will be radically different from the strategies and processes employed to date, if this concept of e-learning is to be appreciated and sustained.

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