

---

# Leading global e-learning futures: A “No. 8 wire” opportunity?

Wayne Mackintosh  
Centre for Flexible and Distance Learning  
University of Auckland  
New Zealand  
<http://cfdl.auckland.ac.nz>  
[w.mackintosh@auckland.ac.nz](mailto:w.mackintosh@auckland.ac.nz)

Keynote address, e-Fest 2004. *Thinking Together*. 11-12 October 2004, Wellington.

|   |
|---|
| <p>This work is licensed under the Creative Commons Attribution-ShareAlike License. To view a copy of this license, visit <a href="http://creativecommons.org/licenses/by-sa/2.0/">http://creativecommons.org/licenses/by-sa/2.0/</a> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA.</p> |
|---|

---

## 1. Introduction

This paper will delve into questions concerning the latent potential within New Zealand to play a leadership role in emerging e-learning futures. These questions need to be examined within the context of a difficult tension. On the one hand, digital information and communication technologies (ICTs) have yet to transform the international practice of education in significant ways (despite the inherent potential of the technology to do so). On the other hand, society has changed in fundamental ways because economies are now global and informational (Castells 1996). Evans and Nation assert that the “new technologies and the way they have been deployed by business, government, and other institutions have yielded significant, and sometimes fundamental, changes to the way work and society operates” (2003: 785). These social and economic developments suggest the imminence of deep-seated change in educational practice in order to meet the changing needs of our world.

Following the burst of the dot-com bubble – shortly after the advent of the new millennium – the predicted boom in e-learning seems to have been a non-event. In this regard, Zemsky and Massy (2004) refer to e-learning as a “thwarted innovation” drawing on their longitudinal study of the implementation of technology on selected campuses in the United States. In contrast, Christensen, Aaron and Clark (2003: 45) report that distance learning is growing at three times the rate of conventional campus-based delivery in the United States – largely fuelled by the growth in online delivery of courses. Elsewhere, Oblinger and Kidwell (2000) drawing on market research have predicted unprecedented growth in the expansion of the distance learning market through online delivery. Clearly there is some uncertainty about how e-learning technologies will impact on educational practice in the future.

New Zealand is renowned for its highly creative and inventive society. The “No. 8 wire” metaphor of making anything from a piece of number eight fencing wire will need no introduction with this audience. There are a number of structural features emerging within New Zealand at this time, and combined with ‘No. 8 wire” resourcefulness, I believe that this may provide fertile ground for innovation in e-learning. Moreover, recent sociological evidence derived from the Finnish experience of becoming a global leader in the information society reveals a number of interesting similarities with the New Zealand situation. For New Zealand, this suggests the plausibility of exciting things happening in e-learning. Is this an opportunity for New Zealand to play a leadership role in the future of e-learning?

## 1.1 Selected observations on e-learning

First a few observations from my own experience as an e-learning practitioner, both here in New Zealand and offshore, which I have used to develop the structure for this presentation. I recognise that my observations are somewhat anecdotal, but I will attempt to provide brief justifications.

Observation 1: *e-learning isn't going to go away...*

In fact e-learning is going survive, in spite of its somewhat disappointing performance. I must stress that I do not count myself as one of the “sceptics” reminiscing for the nostalgic return of the university of “old” where the professing of knowledge and scholarship is supposedly best achieved in dialogue situations without the technological distractions of monitoring discussion forums or uploading resources for remote access. Instead, I count myself as one of the “radicals” who sees huge potential for promoting the quality of learning and scholarship through the adoption of digital ICTs in new, but sustainable ways that support the traditions of the academy. Consequently, my disappointment with progress in e-learning to date, is not a value judgement against the notable achievements of the early pioneers that **are** making a difference in the efficiency and effectiveness of learning delivery for many students through the smart adoption of technology. Rather, my criticisms are introspective because as an advocate of e-learning futures, I feel that we have yet to achieve the transformations we have promised. Gonick captures my sentiments rather well:

*Yes, some faculty members are resistant, some are stubborn, and some are counter-revolutionary. But the truth is that technology itself and those of us who represent the corporate and institutional agents of change in the teaching environment have thus far failed. ... Until technology becomes a core part of the teaching environment, it will not be seen as truly strategic. Until technology solutions are internalised within the teaching practice, recurring investment in technology will be seen as less than necessary. (2002: 8)*

Putting aside my self-criticisms for a moment, there is substantive evidence that e-learning is here to stay. Koper, for example likens e-learning to “a fact of life” in the modern world

and points out that no one “disputes whether e-learning should be applied or not” (2004: 64). In the early 1990s, only a small proportion of conventional campus-based institutions offered distance learning courses yet by the year 2000 Daniel indicated that “no self-respecting university president can admit to not offering courses online” (2000: 3). These figures are corroborated by hard data. For example in the 1997-1998 review period 44% of higher education institutions in the United States offered distance-based courses (CHEA 1999a) and in the 1998-1999 review period this figure had increased to 62% (CHEA 1999b). As indicated above, distance education in the United States is growing at three times the rate of face-to-face programmes (Christensen, Aaron & Clark 2003: 45) and Bates (2004) reports that in North America, a growth rate of 12% per annum has been sustained for the last 5 years.

Irrespective of whether you are a “sceptic” or “radical” concerning the adoption of digital ICTs in education, e-learning is here to stay.

Observation 2: *You can't really own e-learning within an organisational hierarchy.*

Within many educational organisations around the world, I have observed a dynamic scurry among existing departments and organisational structures to claim custodianship over leading e-learning futures. On the one hand, this attests to the organisational recognition that e-learning is important for the future of educational institutions and worth the effort to stake claims of ownership. Yet, on the other hand, digital ICTs are cross-cutting technologies that permeate throughout the organisation and are primarily about facilitating and enhancing the effectiveness of communication and interaction. Thus the concept of “e-learning” cannot be owned any more than the communication content carried over institutional telecommunication networks. However, as White comments:

*In academic settings, computer technology is either a divisive issue between administration and faculty or has the potential to become one. In essence, a power struggle is erupting over how higher education will be conducted. Battles for power are hardly ever amicable affairs, and I can understand why faculty may be tempted to portray administrators as evil conspirators. ... Conflict is an inevitable and unavoidable part of organizational life. The resolution process is critical; if both parties are wise, they will negotiate win-win outcomes. Unfortunately, wisdom is often the first casualty of confrontation, especially when the stakes are high. (1998: 2).*

The problem is that “e-learning” as a concept has no inherent meaning of its own, other than a close association with electronic technologies. Its meaning is derived or referenced from something external to the concept itself, namely that “e-learning” is learning. Leaving the “e” off e-learning, does it still make sense to assign departmental custodianship and accountability for learning? In other words, which departments in tertiary education institutions should be responsible and accountable for managing learning? That said we should accept that e-learning presents new challenges and roles that are not easily accommodated within traditional structures.

Oblinger and Kidwell remind us that emerging technologies will alter the core processes in the university and that these changes are different from the past:

*Fundamental technological change ultimately results in significant structural change, regardless of whether the affected participants choose to join or resist the movement. The changes that universities have weathered over the centuries did not upend their basic technology. Information technology did and does. (2000: 39).*

Because e-learning is essentially **learning**, the transformation referred to above, is primarily a pedagogical transformation – not a technological one with regard to planning for structural change. Consequently in this presentation, I will focus my analysis on the nature and extent of the emergent pedagogical transformation. Furthermore, the scurry for organisational custodianship of e-learning necessarily assumes that a traditional organisational hierarchy is the optimal form for building e-learning futures. This raises the challenging question: To what extent should to replicate past organisational structures and processes in order to create the future?

*Observation 3: Organisations spend large sums of money on IT solutions and then we spend large sums of money defending why we spent so much money in the first place.*

This is an idiosyncrasy that faces all organisations, and while the statement is unquestionably anecdotal, I include it to illustrate the difficulties of managing change with regard to IT in education. For instance, IT managers in education have the thankless task of implementing large-item budget decisions notwithstanding what has been called the IT investment paradox. In education, it is extremely difficult to validate return on IT investment because the benefits are largely intangible, difficult to measure and they are spread across the institution – hence the investment paradox because the real value of IT is not easily measurable in terms of traditional return on investment models. For example, how do you measure the organisational benefits of e-mail, when measured against the significant investment in infrastructure? Moreover this infrastructure is used for functions and purposes beyond e-mail alone, for example web technologies including learning management systems, financial systems, human resource systems etc.

With regard to the tensions between strategic versus operations management, consider the following hypothetical situation. Assume a new word-processing solution was to be released on the market that would result in significant savings combined with demonstrable enhancements in the productivity. It would require a very brave IT manager that would take the decision to change the enterprise word-processing software supported by the institution. This does not take into account the additional costs of consultation, advocacy, training and support when changing a centrally supported software application. Hence there is a tendency within all organisations to subtly influence strategic decisions from the starting point of existing operations. The attitude of “better the devil you know” has a strong support base when it comes to difficult decisions in IT at the expense of the opportunities for meaningful and sustainable innovation.

Drawing on these observations, I have structured this presentation into the following subsections:

- *Learning from international experience.* New Zealand has the advantage of drawing on the international experience of e-learning. In this regard I will reflect on selected findings of the Zemsky and Massy (2004) report taking into account well-founded criticisms and rebuttals of the research.
- *Transforming for e-learning futures.* This concerns managing the tensions between sustainable economics and innovation. I have inferred that reorganising for the future is a pedagogical challenge. I will draw on what we know about the process of innovation and map this to pedagogical alternatives for the future.
- *Images of e-learning futures.* In this section, I will risk identifying what I believe to be significant trends worth exploring for e-learning futures.
- *The plausibility of “No. 8 wire opportunities”* In this section I hope to explore the latent potential of New Zealand to play a leadership role in e-learning. In this section I will draw on the Finish experience on becoming a global leader in the information economy in conjunction with structural elements supporting e-learning and Kiwi ingenuity for innovation.

---

## 2. Learning from international experience in e-learning

New Zealand's achievements regarding the implementation of e-learning at the institutional level compare favourably with the rest of the industrialised world. In fact New Zealand's pioneering spirit is demonstrated by the relatively high number of home grown e-learning systems, including for example: Cecil from the University of Auckland (<http://cecil.auckland.ac.nz>); PLACE originating from the University of Waikato (<http://www.ectus.net>), and Interact, the open source system developed by the Christchurch College of Education (<http://www.interactlms.org>).

On the other hand, some commentators are more critical of New Zealand's adoption of e-learning technologies. For example the relatively slow uptake of metadata standards when compared, with national initiatives like: Canada's Cancore project, which was setup to identify and adapt a subset of the Learning Object Metadata standard for the country (Cancore 2004); or the EdNa Metadata Standard “designed to support interoperability across all sectors of education and training in Australia” (EdNa 2004).

In hindsight, this lag is arguably a strategic advantage for New Zealand, because in a globally connected world, we have the advantage of learning from the early experiences of others. In the realm of leading strategic futures, the timing of new innovations is as important as the innovation itself. Research shows that the pace of technological innovation usually outstrips the ability of society to absorb new innovations (Christenson, Aaron & Clark 2003). Typically the market will permit technological innovation only if it is perceived that the new technology will “not disrupt the existing value structure of the community” (Phillips 2000: 267).

The recent findings published in the Zemsky and Massy (2004) report – *Thwarted Innovation. What happened to e-learning and why* – provide a sobering reality check of what we really have achieved. The message of the report is clear – if we intend to be successful with e-learning on our campuses we will need to do things differently. This suggests that the timing may be right for innovations in e-learning.

As advocates of e-learning we have become accustomed to the positive “hype” documenting the transformation of learning practice by capitalising on the advances of digital ICTs, and I imagine for many e-learning practitioners, the Zemsky and Massy report is something out of the blue, an unexpected set-back. At face-value, the report could impede rollout of e-learning at some organisations, and I imagine that some managers will be using the report as a justification to curb further investment in e-learning. The report will no doubt trigger much controversy within the e-learning community and we are already seeing early rebuttals. Twigg (2004), for example, is highly critical in her review of the report which she entitles: *A little knowledge is a dangerous thing*. Twigg questions: whether the limited sample of six institutions is sufficient to generalise findings across all colleges and universities; the methodology adopted for the study; and points out that while Zemsky and Massy are distinguished researchers, they are not considered to be experts in e-learning.

On the other hand, the findings in the report are already well-known to people practising in the field of open distance learning. We know that the pedagogical design requirements of asynchronous learning differ from those associated with campus-based teaching. Furthermore, we are familiar with the requirement of combining several fields of expertise in a course team to develop effective e-learning resources (Daniel & Mackintosh 2003: 817; Schlusmans, Koper & Giesbertz 2004: 129). In the absence of recognising these distinctive characteristics of asynchronous learning, organisations are likely to experience the problems reported by Zemsky and Massy.

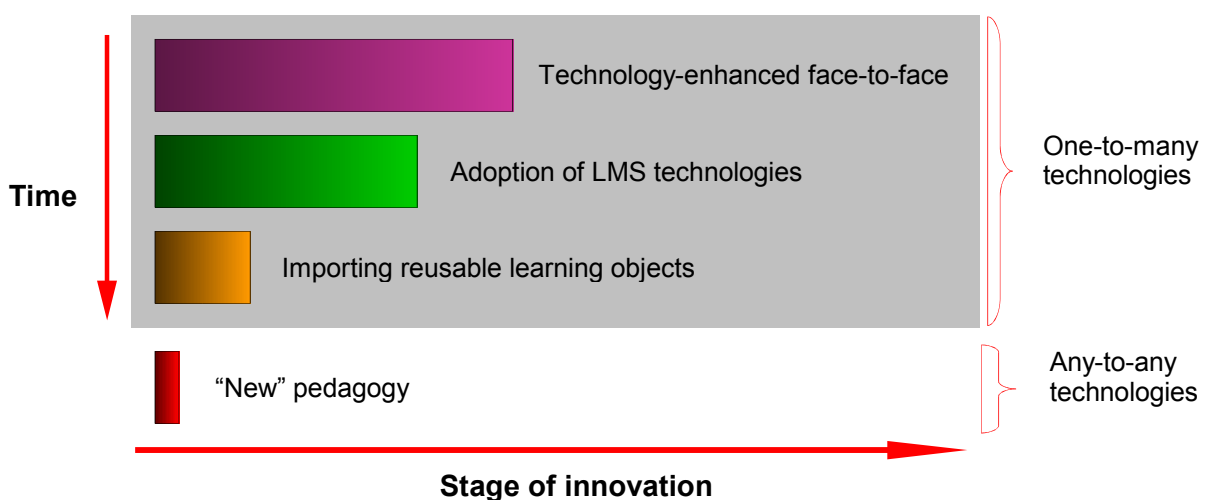
The traditional pedagogy associated with residential institutions continues to prosper, and the e-learning boom did not materialise. It is unclear, however, whether this lull signifies the demise of the e-learning revolution or whether we are in a state of temporary reprieve – where early experimenters are licking their wounds and learning from past mistakes before the next accelerated cycle of transformation. Therefore, I believe it useful to examine the major findings of this report to see what we can learn from international experience. The major findings I would like to highlight from the Zemsky and Massy report in this section are:

- *E-learning, on its own, is not a force that changes the way we teach*. Despite the potential of digital technologies to support and promote more constructivist processes of autonomous discovery learning, most academics still teach the way they were taught – that is transmitting the basic knowledge students need. Hence the proliferation of course management systems and PowerPoint packages that distribute content rather than teaching it. Zemsky and Massy contend that: “E-learning will become pervasive only when faculty change how they teach – not before” (2004: iii).

- *In e-learning we have not succeeded in connecting students meaningfully – that is, ways that promote and enhance their learning.* At most, learners experience e-learning as a convenience – an organisational mechanism that enhances organisational efficiency but not necessarily pedagogical effectiveness.
- *The differentiation between four distinctive e-learning adoption cycles, each at a different stage of innovation within the higher education sector.* With reference to Figure 1 below, Massy and Zemsky (2004: 10) distinguish among the following adoption cycles:
  1. Technology-enhanced face-to-face teaching which shows the highest uptake in the study. For example, e-mail, the Internet and off-the-shelf software like PowerPoint to enhance classroom presentations.
  2. Adoption of learning management systems, to support administrative tasks like grading, providing access to courses recourses and facilitating course based interaction. Zemsky and Massy estimate that this phase is moving rapidly through the early majority phase of the classic S-curve pattern of technology adoption.
  3. Importing learning objects into courses although very few institutions are experimenting with enterprise level, learning content management systems. Online organisations are springing up to host and support the distribution of learning objects.
  4. Implementing “new” pedagogy, a concept I am using to differentiate new configurations of the teaching and learning processes where professors and learners adopt new roles taking full advantage of the new technologies and facilitating interaction in novel ways.

This is an important differentiation because it recognises different phases of e-learning adoption that are occurring in parallel with each other. Moreover, it establishes an important link between S-curve analysis and innovation in e-learning that will be analysed in more depth later in the paper.

Figure 1 Adoption cycles in e-learning



Adapted from Zemsky and Massy (2004 :11)

In summary, if we are serious about moving forward with the adoption of e-learning in higher education we will need to change the way we teach ensuring that we connect learners in novel but meaningful ways to the learning process and its community of scholars. A deeper analysis of the different phases of adoption in general and S-curve analysis in particular could provide us with the clues we need for sustainable innovation in e-learning.

---

### 3. Transforming for e-learning futures

Organisations around the world are faced with the perplexing challenge of managing a difficult balance between sustainable economics and innovation. This is equally true of education institutions grappling with the successful implementation of e-learning on their campuses. While much is known about the process of innovation in the corporate sector, higher education is not normally associated with the leading edge of sustainable innovation. To be fair, innovation in education is not easy, particularly when taking into account the social responsibilities of higher education that cannot be compromised. The growing groundswell in online learning is nudging institutions into confusing and uncertain futures:

*Most colleges and universities feel pressure to do something about online learning and to do it soon. But most are finding it difficult to know what to do or how to do it within their resources and while fulfilling their missions. (Sjogren and Fay 2002: 52).*

In the introduction of this paper, I alluded to the premise that prospective innovation related to the adoption of technology in education is a pedagogical challenge because e-learning is **learning**. Accordingly, I propose that we should search for the relationship between innovation processes and transformative pedagogy. In other words, how can S-curve analysis and what we know about technology-innovation be translated to pedagogical terms?

Handy's (1994) sigmoid curve analysis provides a useful frame of reference to understand the life cycle of societal phases in general and the transformation of organisations in particular. The sigmoid curve is an S-shaped curve that represents how a new initiative first wanes before it continues on an escalated path of expansion and growth. At some stage in the future, the sigmoid curve reaches an inflection point signifying the beginning of an organisation's course of steady decline. Handy suggests that the "secret to constant growth is to start a new sigmoid curve before the first one peters out" (1994: 51). Discontinuity, like radical advances in technology, can disconnect an organisation from its existing path thus forcing the inception of a new sigmoid-curve. However, S-curve analysis on its own is not sufficiently comprehensive to explain the potential impact of new technologies on pedagogy and organisational transformation. In this regard, Christensen's research (Christensen 2000; Christensen & Overdorf 2000) derived from S-

Curve analysis provides valuable insights. He has identified two distinctive types of technological change:

- *Sustaining technologies* which enable organisations to improve the efficiency and effectiveness of existing operations. In terms of S-curve analysis sustaining technologies would be represented by the start of a new S-curve on the same axis; and
- *Disruptive technologies* which are closely aligned with certain types of innovation because they result in new market propositions that did not exist before. Disruptive technologies are difficult to integrate within existing organisations and sometimes result in an organisation's failure. The S-curve for disruptive technologies cannot be plotted on the same axis as the preceding curve, because they "measure *different* attributes of performance than those relevant in established value networks" (Christensen 2000: 41).

Sustaining technologies focus on improving existing product performance by reducing cost or enhancing quality, whereas disruptive technologies create new value networks. In the business world, a value network refers to how "a firm identifies and responds to customers' needs, solves problems, procures input, reacts to competitors, and strives for profit" (Christensen 2000: 32). Each enterprise operates within a specific value network comprising a nested network of producers and market users. Similarly, educational institutions have processes for developing and delivering teaching to its students within a complex educational market. There are technologies that will enhance the performance of existing processes and conceivably there are technologies that could result in a new value network from a pedagogical perspective.

Reflecting on social transformation, Peter Drucker reminds us that:

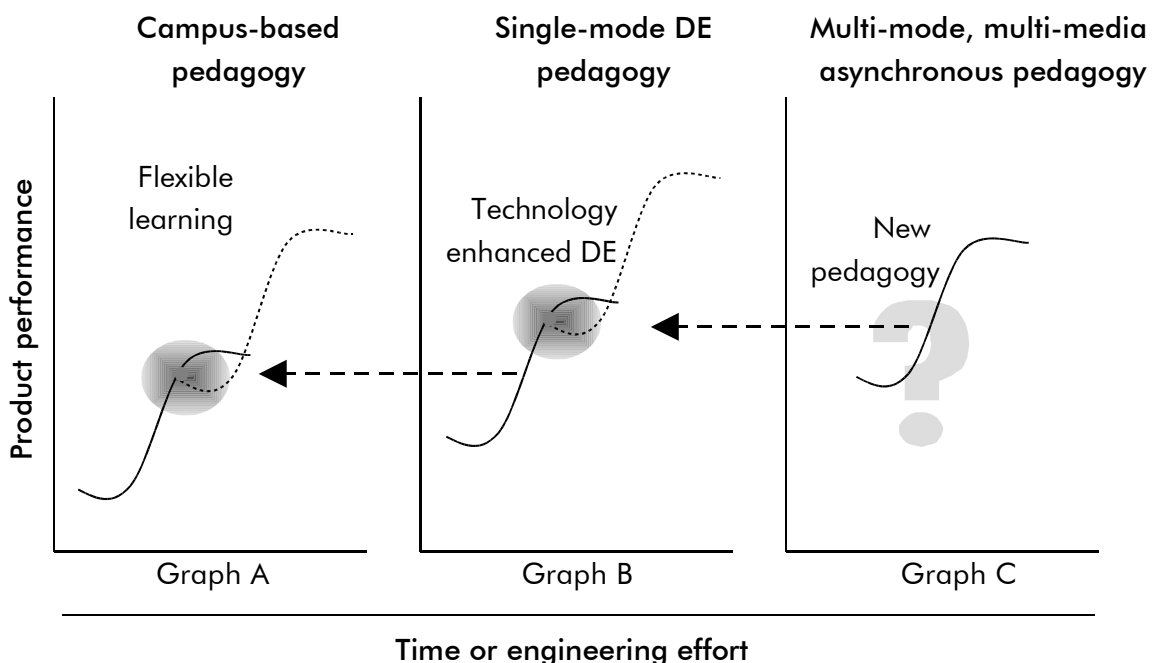
*Every few hundred years throughout Western history, a sharp transformation has occurred. In a matter of decades, society altogether rearranges itself -- its worldview, its basic values, its social and political structures, its arts, its key institutions. ...And the people born into that world cannot even imagine the world in which their grandparents lived and into which their own parents were born. Our age is such a period of transformation. (1995: 75-76)*

The industrial revolution is a prime example of such a sharp transformation or discontinuity. The current era – to which Drucker refers – is a distinctive socio-economic system when compared to the preceding industrial economy. It denotes a shift towards a technological paradigm (Castells 1996). Education as a social practice has not been left untouched by these transformations. Peters, for example, has argued that the development of the single-mode, distance education institutions are the consequence of the industrialisation of society thus highlighting that this form of delivery is not simply a technological extension of campus-based pedagogy (see for example Peters 1968, Peters 1989 and Peters 1994). The point is that distance education did not exist prior to the onset of the industrial revolution requiring the technology of moveable type and universal postal services. Unfortunately much of the contemporary activity associated with online delivery (in many respects a modern form of distance education) is taking place "without

the benefit of the expertise and understanding that decades of research, theory, and practice in distance education could provide” (Evans & Nation 2003: 785).

When analysing the strategic impact of emerging technologies on institutionalised pedagogical modalities, Figure 2 provides an insightful frame of reference. Figure 2 draws on Christensen’s (2000) reported differences between sustaining and disruptive technologies illustrating that disruptive technologies result in a new S-curve on a new axis as opposed to starting a new S-curve on the same axis as in the case of sustaining technologies. The central argument is that the pedagogical structure of campus-based pedagogy differs from the pedagogical structure of distance education, and conceivably the pedagogical structure of multi-mode, multimedia pedagogy will also differ from preceding forms of delivery (see discussion below).

Figure 2: Comparing sustainable versus disruptive technologies from a pedagogical perspective



Three distinctive value networks can be identified with specific reference to the strategic impact of emerging digital technologies:

- First, digital ICTs that are integrated into the campus-based delivery model improving the efficiency and effectiveness of campus pedagogy and often reported under the concept of “flexible learning” or more recently “blended learning”. This is an example of a sustaining technology illustrated by the onset of a second sigmoid curve in the Mode A graph of Figure 2 ;
- Second the implementation of new technologies to enhance the efficiency and effectiveness of the delivery model associated with the large-scale, single-mode ODL institutions. This is also an example of a sustaining technology as depicted by the “technology-enhanced DE” s-curve on the Mode B graph of Figure 2. Note

that the original DE curve is plotted on a new axis representing the disruptive nature of traditional DE as distinctive from face-to-face pedagogy;

- Finally the speculative potential for innovating new pedagogy now possible through contemporary advances in digital ICTs. This is an example of a disruptive technology because the resultant pedagogy would be fundamentally different to what has gone before. Notably, this is not a second sigmoid curve derived from past pedagogy, but is a new curve on an independent axis because the new technologies result in different attributes of performance (see the Mode C graph);

The three modes introduced in Figure 2 suggest that the way e-learning evolves at conventional campus-based universities and DE institutions is likely to be different because “traditional and distance universities start from different pedagogical preconditions” (Peters 2003: 87). The implication for organisations is to recognise that the implementation of technology does not necessarily alter pedagogical structure of its activities. Consequently, in the case of traditional face-to-face institutions, the adoption of technology to improve the efficiency of campus-based teaching does not necessarily result in pedagogical adaptations. However, where traditional campus-based organisations embark on the delivery of distance education, changes in the way teaching is planned, developed and delivered will need to be implemented. Similarly organisations that are contemplating the development of multi-mode pedagogy will need to consider the corresponding transformation implications.

The specific roles that the new learning technologies assume in the teaching-learning situation actually alter the pedagogical structure (when compared to face-to-face teaching) because they carry the functions of teaching (see Peters 2003: 87). Media resources that are used as adjuncts in support of face-to-face pedagogy, for example PowerPoint slides or downloadable lecture notes do not alter the pedagogical structure of classroom teaching. However, online resources designed for distance learning must actually carry or mediate all the functions of teaching including the presentation of content, forms of interaction (both simulated and real dialogue) and assessment. This alters the pedagogical structure of teaching. With regard to face-to-face pedagogy, this is a choice and the implementation of ICTs in the classroom does not necessarily predetermine pedagogical restructuring. Also, we need to explore how existing pedagogical structures may be altered under the “new” pedagogy suggested under Mode 3 of Figure 2.

In the following section, key technology trends associated with the progression of e-learning are introduced with the view of probing how emerging technologies may influence the pedagogical structure of learning in the future.

---

## 4. Images of e-learning futures

Speculating about e-learning futures can be dangerous. Drucker advises that:

*In human affairs — political, social, economic, and business — it is pointless to try to predict the future, let alone attempt to look ahead 75 years. But it is possible — and fruitful — to identify major events that have already happened, irrevocably, and that therefore will have predictable effects in the next decade or two. It is possible, in other words, to identify and prepare for the future that has already happened. (1998: 16).*

Drucker is suggesting that we should search for deeper meaning about the events happening around us and then to use this new founded understanding as a foundation to proactively generate responsible futures that are appropriate for education.

While the pervasive advances in digital ICTs provide opportunities for increasing levels of synchronous interaction in large-scale ODL systems and increasing levels of asynchronous communication in face-to-face systems, this should not be confused with the disruptive potential for new-pedagogy. Christensen, Aaron and Clark emphasise this distinction:

*The key for those developing or managing online programs is to recognize that online learning itself is not inherently sustaining or disruptive in nature; rather, it is how and to whom this innovation is deployed that ultimately determines whether online learning will be sustaining or disruptive (2003: 54).*

In my view, e-learning has reached an important juncture in its history. On the one hand, learning management systems have attained the status of industry standard software in education not unlike the status of word processing software two decades ago. Yet, as technology goes, learning management systems are relatively immature. In essence they are a collection of infrastructure technologies combined with a few interaction tools that are capable of delivering through the medium of the Web. While learning management systems have progressed considerably, Fuchs points out that:

*there's still much that can be done to improve usability in particular, especially to make it easier to publish or create new material. ... I think we need authoring tools that lower the effort threshold dramatically for faculty to take digitized materials and create something esthetically pleasing as well as effective for their teaching purposes. (2004: Online).*

Apart from the current limitations in learning management systems, as educationalists, I not sure whether or not we fully understand the significance of the web as a communication technology, nor have we realised the educational potential and power of the network.

The Web is a communication technology that can simultaneously provide something to talk about as well as the means to hold the conversation. Brown and Duguid sum up this characteristic in the following way:

*The value of the Net doesn't simply lie in the way it allows groups of people to talk with one another. It also comes from the way that, unlike telephones or video links, the Net can provide common objects for participants to observe, manipulate, and discuss. It's not, then, simply a medium for conversation, nor is it just a delivery mechanism. It combines both, providing a medium for conversation and for circulating digital objects. Furthermore, it also allows participants to turn the ongoing conversation itself into another object of conversation for further reflection. (1995: 16)*

Deserving particular mention is the fact that the web is the first universal communication technology that provides us with this dual capability. Therefore the structures of traditional face-to-face and classical distance education pedagogies do not necessarily provide sufficiently comprehensive foundations for designing new pedagogy because we do not have adequate experience in this new dual mode of communication. Many educational applications on the Web merely succeed in replicating existing pedagogical frameworks.

The network as a system of interconnected nodes and has no hierarchy or centre (Castells 1998). Thus the network is a self-organising system that according to Heylighen and Gershenson "not only regulates or adapts its behaviour, it creates its own organization" (cited by Koper 2004b: 12). With reference to Figure 1, the first three adoption cycles utilise one-to-many infrastructure technologies where content is stored in a central repository and delivered to students on demand. Most of the interaction is usually administered by the same technology. One-to-many technologies lend themselves to transmission pedagogical modalities, and are not necessarily designed according to nature and structure of a network – the dominant organisation principle of the information society.

This is very different from the one-to-many technologies where the systems and teaching are defined by the designer. Increasingly new pedagogy is likely to shift in the direction of any-to-any technologies, where the self-organisation principles of the network will prevail. The resultant organisation is undefined, and the ultimate impact on the pedagogy is unknown. This new era of self-directed, autonomous learning combined with the potential of multi-mode, multi-media learning is fertile ground for new innovations in e-learning. Educational institutions will need gain a deeper understanding of these networked relationships and how they are likely to impact on their practice.

---

## 5. No. 8 wire opportunities

*"We haven't the money, so we've got to think"* - Sir Ernest Rutherford

Kiwi innovation abounds. Consider, for example: Robert Dickie's invention and patent of the world's first stamp vending machine; Richard Pearse's achievement flying a self-built monoplane – eight months before the Wright brothers' flight at Kitty Hawk, North Carolina; Harold Gillies' pioneering work in establishing the "discipline" of plastic surgery; Ernest Rutherford, the nuclear physicist and Noble Laureate for Chemistry who was the first person to knowingly split the nucleus of an atom; Colin Murdoch's invention of the disposable syringe and tranquiliser dart gun or Britten's V1000 racing motorcycle that dominated the racing circuits at the time.

Clearly, there is an intriguing connection with New Zealand and innovation. Moreover, many Kiwi innovations have had a significant global impact – notwithstanding New Zealand's geographical location at the "ends of the earth". Interestingly, the majority of the examples cited above took place before the advent of a globally connected knowledge economy. Furthermore, it appears that there is implicit wisdom in Rutherford's assertions that New Zealand's budgetary challenges are a catalyst for creative thinking thus contributing, to some extent, to the impressive rate of innovation from New Zealand.

With regard to higher education, comparative funding levels in New Zealand are lower than some of the industrialised economies of the world – thus implying the imperative for us to think creatively in e-learning. Notwithstanding these comparative funding limitations, New Zealand is one of a handful of countries in the world that reports a gross-enrolment ratio for tertiary education above 90% for the traditional age-cohort. Taking into account the track record of innovation combined with kiwi resourcefulness and creative thinking precipitated by budgetary constraints, it is certainly plausible that New Zealand could play a leadership role in e-learning futures. Perhaps this is an "X-factor" advantage, that when combined with a number of existing structural building blocks; New Zealand could play a role in triggering a process of global innovation in e-learning. I contend that there are a number of policy related elements within New Zealand that provide fertile ground for leading e-learning futures, and few of these are highlighted below:

- First, Government established the E-learning Advisory Group in July 2001, culminating in a report published in March 2002, entitled: *Highways and Pathways. Exploring New Zealand's e-learning opportunities* (ELAG 2002). In the context of this address I would like to underscore the following essentials of the report:
  - The unequivocal declaration that e-learning "will only be successful if it is based on sound pedagogical approaches" (ELAG 2002: 6);
  - The recurring theme of collaboration and dialogue within the sector as a necessary prerequisite in order to achieve sustainable e-learning futures;
  - The emphasis on local leadership to forge an e-learning vision with a New Zealand identity;

- Astute consideration of the need to develop foresight for the future of e-learning in New Zealand by evaluating strategic options through the use of tools such as scenario planning.
- The establishment of the e-Learning Collaborative Development Fund investing \$28 million over four years from 1 July 2003 to 30 June 2007. The fund is designed to enhance the system's capability through collaborative and strategic implementation of e-learning in tertiary education organisations.
- The institution of the Tertiary e-Learning Research Fund by the Ministry of Education. While in absolute monetary terms, this is not a large fund. However, its focus is forward-looking and the first round will produce some of the conceptual building blocks required for a sector wide scenario planning exercise on e-learning futures in New Zealand (MOE: Online).
- An overview and inventory of international technical standards in e-learning commissioned by the Ministry of Education (e-Learnz 2004).
- The Ministry of Education's *Interim Tertiary e-Learning Framework* (MOE 2004) which is a stepping stone for developing a pan-sector e-learning strategy for New Zealand that will encompass the schools, early childhood and tertiary sectors. The framework outlines a vision, principles and action areas for e-learning in the New Zealand tertiary sector.
- The draft digital strategy document released recently.

The examples listed above are all Government initiated projects, demonstrating a high-level of strategic commitment to e-learning at the policy level. On their own, these initiatives do not signify a global leadership position. Other Governments have also made significant progress in this area, for example policy development work for e-learning in the United Kingdom. The differentiating feature for New Zealand becomes evident when this favourable policy environment for e-learning is considered in the context of: New Zealand's disposition for innovation; the ability to respond quickly to changing demographics because of its relatively small population; the high levels of dialogue between Government and the education sector; and a strong New Zealand identity. These factors are not easily replicated in larger industrial economies like Canada, the United Kingdom, or the United States.

These high-levels of government engagement in e-learning futures, as New Zealand moves forward into the knowledge economy, present a sociological paradox. Sociologists have noted the breaking down of the nation-state relationship as a condition of late modernity and the emerging informational economy (see for example Giddens 1990 & 1999). Within "expert circles around the world liberalization and disengagement from the public sector in society" (Castells & Himanen 2002) is often seen as a precondition for a sustainable information economy. This raises the interesting question of whether or not Government's initiated policy are building blocks for leading e-learning futures taking into account the liberalization and disengagement of the public sector usually associated with the information economy.

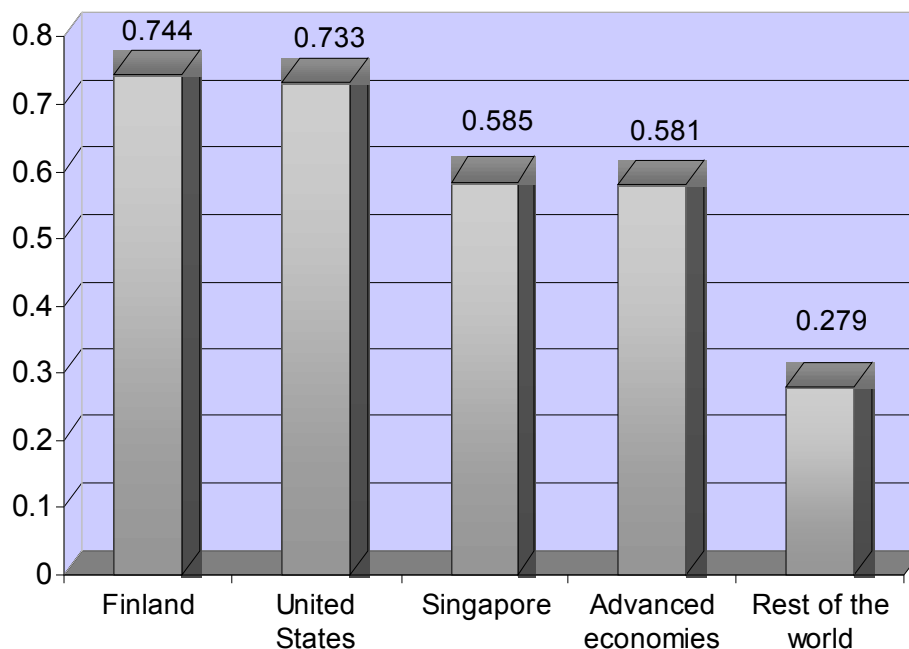
However, in this regard, recent research of the Finnish experience of the information economy suggests that the existence of a welfare state is not incompatible with

technological innovation and the development of a dynamic information society. This may disprove the claim that liberalisation and disengagement from the state are necessary preconditions for a vibrant information society (Castells & Himanen 2002). Consequently, a brief analysis of the Finnish experience in comparison with New Zealand could inform e-learning developments for the future. First, I would like to highlight selected indicators of Finland's extraordinary achievements then focus on key elements that have promoted Finland's success. Where appropriate I have emphasised important similarities with the New Zealand situation as they relate to innovation in e-learning. Also I must stress that there are risks associated with drawing direct parallels because of the structural differences between the respective economies, for example the levels of investment in research and development.

Finland is independently rated as one of the most dynamic economies of world and with the United States and Singapore is listed as one of the top three of the world by the International Institute for Management Development (Castells & Himanen 2002: 4). On a technological dimension, Finland is, as advanced as Silicon Valley or Singapore, using the UN Technology Achievement Index as shown in Figure 2 below.

There are two aspects which single Finland out as a unique case study. First, Finland was only three generations ago a relatively poor country, dominated by an agrarian-based economy largely dependent on its forest resources. (Castells & Himanen 2002: 13 & 169).

Figure 3: Technological development using the UN technology achievement index



Second, when measured on social indices including: the ratio between the richest and poorest 20 percent of the population; the extent of social exclusion measured according to functional illiteracy; or other measures of social inequality (see Castells & Himanen 2002: 7 - 11); Finland outperforms its counterparts thus dispelling the association that a welfare state cannot perform well in the information economy.

It is tempting to draw parallels – albeit at a superficial level – with New Zealand and Finland. For instance, Finland’s relatively small population of 5.2 million; the welfare state comparisons; and our very high gross enrolment ration for tertiary education which matches up rather well with Finland. As indicated above we should not ignore the risks of reducing complexity for the sake of simplicity. Nonetheless, it is encouraging to note that a small country can become a global leader in the information society. I do not have the scope in this presentation to adequately analyse important structural determinants of the Finnish case study, for instance, the delicate balance associated with the state guiding the development of the information economy without bureaucratic control; deregulation versus the facilitation role that of a shared national infrastructure; explicit policies ensuring population wide inclusiveness in the information society, the nature and extent of investment in education and investments in relevant research and development. I would encourage the policy developers to seriously consider commissioning a more detailed analysis from the perspective of an e-learning bias.

However, I would like to single out two aspects which I think are particularly relevant for our discussions today. Firstly, the significance of a strong cultural identity and national sentiment, demonstrated to be essential components of the success of the Finish model of the information society (Castells & Himanen 2002: 169). While I cannot speak as an authority on Kiwi identity, I can affirm that this culture is very real, and I must commend the ELAG group for prioritising “identity” as a foundation for driving the e-learning vision in New Zealand. Moreover globalisation is defined as “the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by the events occurring many miles away and **vice versa**” (Giddens 1990:64, my emphasis). While globalisation is very often perceived as something that is forced upon national economies, we sometimes forget the opportunities for local innovations to influence global development. Therefore we should not forget the driving force of local identity combined with a disposition for innovation to influence global developments.

Secondly, the ethic associated with “social hackers” has played a significant role in Finland’s success in the information society. Here we are not referring to the connotations of illegal access into computer networks and systems, but rather an expression of the welfare state where creativity and technological skills are shared and developed collaboratively for wider social goals. Undoubtedly the most famous Finnish hacker is Linus Torvalds, the visionary that was responsible for pioneering the development of the Linux open-source operating system. Based on market penetration, Linux is clearly one of the most successful operating systems particularly when measured against the operating systems used for web servers.

Hackers have played a significant role in the development of the Internet in general, building on the early work of the Ministry of Defence Advanced Research Projects Agency (ARPA) who were behind the development of the Net. Less publicised is the role of Finish hackers in the history of the Internet. Castells & Himanen (2002: 65) point out that: hackers were originally responsible for bringing the Internet to Finland and advanced its spread rapidly; they played a significant role in transforming the Net into a social

medium; and played a pioneering role in a new innovation system associated with the open-source development model.

A group of hackers with strong connections to the Helsinki University of Technology, Tampere University of Technology and a member of the Finnish Unix User group were responsible for linking the Finnish network to international networks (Castells & Himanen 2002: 63- 73). The Nordic countries were able to join the Internet before other European countries because the Fins were prepared to experiment with TCP/IP-protocols rather than the use of the protocols prescribed by the International Standardization Organization (ISO) – the standards originally supported by European countries. Of particular interest is a letter from Larry Landweber from – NSFNET (National Science Foundation Network) the early backbone of the US research network – where he wrote to Heinänen (one of the Finnish hackers): “it is the policy of the US networks to support the development of standards and the migration of our academic networks to standard (ISO) protocols when implementations are commercially available. As a corollary, we do not wish to take actions that will slow down the standards process, by, for example, promoting the development of an international TCP/IP Internet” (cited by Castells & Himanen 2002: 66). The fact that the modern Internet is a TCP/IP based network is not significant now – but nonetheless highlights the challenges that innovators face when going against the stream of international trends.

Drawing on the history of the Internet, I wonder whether the obsession with de facto metadata standards for learning design has similar parallels to the early dictates of the ISO protocols that constrained early progress of the Net. For example, the e-learning XML Editor (eXe) project – one of the projects funded by the Tertiary Education Commission – has made an early discovery. The eXe project will develop a tool that will enable all teachers to publish professional web-content that is designed for teaching, without the need for users to become proficient in (X)HTML mark up. Content designed for learning requires distinctive form elements like learning objectives, advance organisers and activities. Initial research suggested the need for basing development on the complex world of educational XML schema (implied, for example by the IMS learning design specification). However, we have found that using a script combined with the well-defined HTML elements for web forms we are able to circumvent the more complex challenges of XML schema without compromising interoperability through the use of open Internet standards. This discovery will provide considerable flexibility for users without the need for predefined XML schemas. This is a lesser example of generative innovation, as Drucker explains:

*It is commonly believed that innovations create changes — but very few do. Successful innovations exploit changes that have already happened. They exploit the time lag — in science, often twenty-five or thirty years — between the change itself and its perception and acceptance. During that time the exploiter of change rarely faces much, if any, competition. The other people in the industry still operate on the basis of yesterday's reality. And once such a change has happened, it usually survives even extreme turbulence. (1995: 40)*

The Finnish case study justifies the plausibility for a small country to lead global innovation. New Zealand has an established history of innovation; it is an inventive and resourceful society with a strong cultural identity – factors which have contributed to the success of Finland’s information society. This combined with the policy initiatives associated with e-learning instituted by Government provide a facilitative framework for innovation in e-learning. The higher education sector has a unique opportunity to build on this unique environmental context. Taking into account the risks associated with predicting the future, I think that New Zealand’s innovation in e-learning should concentrate on two interrelated dimensions.

1. Achieving the right balance between collaboration and competition within the sector; and
2. Prioritising developments that aim to establish new pedagogy.

The majority of New Zealand policy initiatives in e-learning are underpinned by the recurring theme of collaboration and dialogue in the sector. However, collaboration for the sake of collaboration could unintentionally do away with many of the beneficial elements of competition.

There are two levels of competition. The first level is where organisations compete on the cost and quality of their products and services. Very often competitive advantage at this level is leveraged through the implementation of technology. The risk of removing competition within the sector at this level is that you could indirectly contribute to lowering the quality of provision. Competition is an effective self-regulating mechanism to promote the quality of service provision. The second level of competition is created by the constant pressure to innovate. This is where the apparent paradox of “using collaboration to promote competition” (Gibbons 1998: 24) can be used productively for creativity and resourcefulness. This second level of competition is based on knowledge and skills, and very often involves higher risk and costs. Gibbons summarises the advantages of this kind of collaboration:

*Collaborative ventures are partly defensive innovations in that they are aimed at reducing or sharing risk and costs. They are also offensive innovations in that they extend the skill base of the firm and the range of knowledge available to it thereby improving its ability to compete. (1998: 25)*

Consequently it makes sense that collaboration should be promoted in two areas. First, it is necessary to promoting collaboration in non-competitive areas such as the development of a shared national infrastructure – the backbone for e-learning delivery. Second, collaboration should be encouraged in the high-risk and more expensive domain of product and process innovation in e-learning. Apart from resulting innovations, the real value in this collaboration lies in the knowledge and skills that are gained. This is the knowledge that will be reinvested within the collaborating organisations in future competitive cycles. Clearly the collaboration should be focused on the pre-competitive phases that will be required for innovating new pedagogy (Mode C in Figure 2), in other words the successful development of disruptive technologies in e-learning.

The thrust of my argument is that a small country like New Zealand would not find it easy to establish a global leadership position in e-learning by competing on the first level of competition relating to the cost and quality of e-learning technologies. However, it is possible for a small country to focus on leadership through differentiation. In other words, New Zealand should encourage developments that will contribute to the establishment of new multi-mode pedagogy. This is a high-risk area and therefore should be executed collaboratively to spread the risks of innovation. As a small country, it is easier to implement experimental approaches that will ultimately lead to sustainable innovations.

In this paper I have argued that e-learning has yet to deliver on its hidden potential. I have explored the tensions between sustainable economics and organisational innovation, taking into account the differences between sustaining and disruptive technologies. Looking into the future, there are emerging technologies that have the potential to advance e-learning in unprecedented ways. Drawing on the culture of Kiwi innovation, the Finish experience of the information society and New Zealand's supportive policy environment for e-learning, we can expect great things to happen in e-learning and possibly the chance of leading global e-learning futures.

---

## References

- Bates, A. 2004. The seven myths of distance education. Keynote address. 21<sup>st</sup> ICDE World Conference on Open Learning & Distance Education. Hong Kong. 18 – 21 February 2004.
- Cancore (Canadian Core Learning Resource Metadata Application Profile). 2004. *About Cancore*. Online: <http://www.cancore.ca/about.html>. Retrieved: 27 September 2004.
- Castells, M. 1996. The rise of the network society. *The information age: Economy, society and culture*. Volume I. Oxford: Blackwell Publishers Inc.
- Castells, M. 1998. Information technology, globalization and social development. Paper prepared for the *UNRISD Conference on information technologies and social development*. Geneva: June 22 – 24 1998. Online: <http://www.acca21.org.cn/info21/link/bg/info/7/castelp1.htm>. Retrieved: 19 March 2004.
- Castells, M. & Himanen, P. 2002. *The information society and the welfare state: The Finnish model*. New York: Oxford University Press.
- CHEA (Council for Higher Education Accreditation) 1999a. *Distance learning in higher education*. CHEA Update: No 2. Online: <http://www.chea.org/>. Retrieved 25: September 2001.
- CHEA (Council for Higher Education Accreditation) 1999b. *Distance learning in higher education*. CHEA Update: No 3. Online: <http://www.chea.org/Research/distance-learning/distance-learning-3.cfm>. Retrieved 25: September 2001.
- Christensen, C.M. 2000. *The innovator's dilemma. When new technologies cause great firms to fail*. New York: HarperBusiness edition.

- Christensen, C.M., and Overdorf, M. 2000. Meeting the challenge of disruptive change. *Harvard Business Review*. 78(2): 66-76.
- Christensen, C.M., Aaron, S., and Clark, W. 2003. Disruption in education. *Educause Review*. 38(1): 44-54.
- Daniel, J.S. 2000. The university of the future and the future of universities. *Improving university learning and teaching. 25<sup>th</sup> International conference*. Frankfurt: 18 July 2000. <http://www.open.ac.uk/vcs-speeches/edin-admin.htm>. Retrieved 21 June 2001.
- Daniel, J.S. and Mackintosh, W.G. 2003. Leading ODL futures in the eternal triangle: A mega-university response to the greatest moral challenge of our age. In. Moore, M.G. & Anderson, W.G. (eds.) *Handbook of distance education*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Drucker, P.F. 1995. *Managing in a time of great change*. New York: Truman Talley Books/Plume.
- Drucker, P.F. 1997. *Forbes*, March 10.
- Drucker, P.F. 1998. The future that has already happened. *Futurist*. 32(8): 16-19.
- EdNa (Education Network Australia). 2004. *EdNa Metadata Standard*. Online: <http://www.edna.edu.au/edna/go/pid/385>. Retrieved: 27 September 2004.
- eLearnz (The New Zealand Consortium for e-learning). 2004. e-Learning standards overview. Prepared for use with the e-Learnz Toolbox. Accessible online from <http://www.steo.govt.nz/eLearningProjects.aspx>. Retrieved: 1 October 2004.
- ELAG (E-learning Advisory Group). 2002. *Highways and pathways. Exploring New Zealand's e-learning opportunities*. Report of the E-learning Advisory Group. Online: <http://www.steo.govt.nz/download/e-learning.pdf>. Retrieved: 25 May 2002.
- Evans, T. & Nation, D. 2003. Globalisation and the reinvention of distance education. In Moore, M.G. & Anderson, W.G. (eds.) *Handbook of distance education*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Fuchs, I. 2004. Learning management systems: Are we there yet? *Syllabus. Technology for Higher Education*. 7 January 2004. Online: <http://www.syllabus.com/print.asp?ID=9675>. Retrieved: 30 September 2004.
- Gibbons, M. 1998. Higher Education Relevance in the 21<sup>st</sup> Century. Paper presented at the UNESCO World Conference on Higher Education. Paris: October 5-9, 1998.
- Giddens, A. 1990. *The consequences of modernity*. Stanford: Stanford University Press.
- Giddens, A. 1999. Globalisation. *Runaway world*. Lecture 1. BBC Reith Lectures. Online: [http://news.bbc.co.uk/hi/english/static/events/reith\\_99/week1/week1.htm](http://news.bbc.co.uk/hi/english/static/events/reith_99/week1/week1.htm). Retrieved: 22 July 1999.
- Gonick, L. 2002. Leadership. A new role. *Educause Review*. 37(4): 8-9.
- Handy, C. 1994. *The age of paradox*. Boston, Massachusetts: Harvard Business School Press.
- Koper, R. 2004a. Learning technologies in e-learning: an integrated domain model. In. Jochems, W., Van Merriënboer, J., & Koper, R. (eds.) *Integrated e-learning. Implications for pedagogy, technology and organization*. London: RoutledgeFalmer.
- Koper, R. 2004b. Use of the semantic web to solve some basic problems in education. *Journal of Interactive Media in Education*. (Special Issue), 2004(6). Online: <http://www.jime.open.ac.uk/2004/5>. Retrieved: 17 June 2004.
- MOE (Ministry of Education). Undated. *E-Learning Projects*. Online: <http://www.steo.govt.nz/eLearningProjects.aspx>. Retrieved: 1 October 2004.

- MOE (Ministry of Education). 2004. *Interim Tertiary e-Learning Framework*. Wellington: Ministry of Education. Accessible online from <http://www.steo.govt.nz/eLearningProjects.aspx>. Retrieved: 1 October 2004.
- Oblinger, D. and Kidwell, J. 2000. Distance learning: Are we being realistic? *Educause Review*. 35(3): 31 – 39.
- Peters, O. 1968. *Das hochschulfernstudium: Materialien zur diskussion einer neuen studienform*. Weinheim, Berlin: Beltz. (Pädagogisches Zentrum: Veröffentlichungen. Reihe C. Bd. 5).
- Peters, O. 1989. The iceberg has not melted: Further reflections on the concept of industrialisation and distance teaching. *Open learning*. 4(3): 3-8.
- Peters, O. 1994. [Translation of Peters's texts into English.] In Keegan, D. (ed.) *Otto Peters on distance education. The industrialisation of teaching and learning*. London: Routledge.
- Phillips, R.J. 2000. Digital technology and institutional change from the gilded age to modern times: The impact of the telegraph and the Internet. *Journal of Economic Issues*. 34(2): 266 – 290.
- Peters, O. 2003. Learning with new media in distance education. In Moore, M.G. & Anderson, W.G. (eds.) *Handbook of distance education*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Schlusmans, K., Koper, R. & Giesbertz, W. 2004. Work processes for the development of integrated e-learning courses. In Jochems, W., Van Merriënboer, J., & Koper, R. (eds.) *Integrated e-learning. Implications for pedagogy, technology and organization*. London: RoutledgeFalmer.
- Sjogren, J and Fay, J. 2002. Cost issues in online learning. Using "co-opetition" to advantage. *Change*. 34(3):53-55.
- Twigg, C.A. 2004. A little knowledge is a dangerous thing. *The Learning MarketSpace*. July 2004. Centre for Academic Transformation. Online: <http://www.center.rpi.edu/LForum/LM/July04.html>. Retrieved: 24 September 2004.
- White, F. 1999. Digital Diploma Mills: A dissenting voice. *First Monday*. 4(7): 1 – 8. Online: [http://www.firstmonday.dk/issues/issue4\\_7/white/](http://www.firstmonday.dk/issues/issue4_7/white/). Retrieved: 12 April 2004.
- Zemsky, R. & Massy, W.F. 2004. Thwarted innovation. What happened to e-learning and why. *Final report for the Weatherstation Project*. College Park: The Learning Alliance at the University of Pennsylvania.