

Research Report

E-learning and higher education: understanding and supporting organisational change

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Executive Summary

Introduction

This report outlines the outcomes of the Ako Aotearoa 2010 National Project Fund Project E-learning and higher education: Understanding and supporting organisational change in New Zealand. Over an 18-month period four educational institutions – a New Zealand university, PTE (private training establishment), wānanga and ITP (institute of technology or polytechnic) – have engaged in a process of change influenced by technology. Their e-learning capability was benchmarked using the e-learning Maturity Model (eMM) and this information used to stimulate and support change activities. The resulting case studies illustrate the issues that face tertiary organisations and leaders engaging with the opportunities and challenges of e-learning. Five factors have been identified as significant influences on the ability of organisations to change in response to technology in the current political and educational landscape of the New Zealand tertiary sector.

Focus and Aims of Work

The project aims were to:

- Use the eMM to provide baseline data on e-learning capability at the beginning and end of the project timeline to inform change and improvement activities and provide evidence of their impact over the duration of the project.
- Work with the staff of participating institutions to understand and support the explicit and implicit processes used to change and improve the e-learning experiences of students and staff in a manner consistent with the institutions' contexts, wider objectives and resource constraints.
- Identify and publish case studies illustrating how institutions of different types and contexts can successfully change and improve their e-learning activities to improve the quality of the student and staff experience of e-learning, and how information from the eMM supports and informs this process.

Context

The New Zealand Government has identified the need for tertiary institutions to make effective use of technology if they are to maintain their relevance over the coming decades (Ministry of Economic Development, 2008). Technology is seen as both driving the need for skills' development and also supporting skills' development for the New Zealand economy (New Zealand Treasury, 2008). The New Zealand Government's recognition of the potential technology offers tertiary education is in line with the many positive outcomes, including the ease with which information can be accessed and the ability to engage with learners and scholars using a wide range of online tools, that have been identified in the literature (Katz, 2008; Kennedy *et al.*, 2009; Anon, 2010; Joint Information Systems Committee [JISC], 2009) and is consistent with the position taken by other governments including the United States (United States Department of Education [USDE], 2009) and Australia (Bradley *et al.*, 2008).

Despite the potential technology offers, there have been few successes and many failures to realise this potential in other than isolated projects (Bacsich, 2005a; House of Commons Education and Skills Committee [HCESC], 2005; Conole *et al.*, 2004; Taylor, 2001; Kenny, 2001; Radloff, 2001). Nevertheless, technology has driven a re-examination of practice within higher education (Katz, 2008). E-learning offers clear and significant benefits to students learning either online or in a technology-supported mode (Kennedy *et al.*, 2009;

USDE, 2009; Anon, 2010). The *Effective Practice in a Digital Age* report (JISC, 2009) notes that e-learning is no longer a specialist area and needs to be seen as a mainstream activity influencing how learning can be enhanced for all students. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) has also identified the significant potential for e-learning to support transnational and cost-effective education (Redden, 2009). The Australian Government's Bradley review of Higher Education (Bradley *et al.*, 2008, p79) includes in its definition of a quality student experience in higher education the need for "an accessible and sophisticated online learning environment." Specifically in New Zealand e-learning offers many potential benefits to Māori and Pasifika students, students with special needs, and adult students who have struggled in the mainstream education system (Davis and Fletcher, 2010; Greenwood *et al.* 2011).

In 2002, the *Highways and Pathways* document (Butterfield *et al.*, 2002) was published, setting out a vision for e-learning in New Zealand. This vision included a recognition of the role that e-learning could play in supporting the success of all New Zealanders through increasing access and affordability. Sadly much of the wisdom of the *Highways and Pathways* report seems to have been lost with little evidence in the current tertiary education strategies of the focus it originally stimulated. Educational institutions need positive strategies for re-engaging with the potential of e-learning beyond simply investing in information technology infrastructure.

Approach

The project as a whole is conceived as action research (Lewin, 1944), looking for evidence of the impact a particular intervention (the eMM) can have on an organisation's behaviours over a two-year period. The eMM (Marshall, 2010b) provides a quality improvement framework by which institutions can assess and compare their capability to sustainably develop, deploy and support e-learning. The eMM has been adopted internationally as a means for both institutions and sector agencies to explore institutional and sector e-learning capability. The eMM has been developed, refined and validated through a series of projects conducted in New Zealand (Marshall, 2006a), Australia (Marshall *et al.*, 2009; Marshall, 2009), the United Kingdom (Sero, 2007; Bacsich, 2008; University of London, 2008) and the United States (Marshall *et al.*, 2008).

Each institution undertook eMM capability assessments that required the participation of a number of staff and the gathering of a corpus of relevant evidence. In addition, a series of structured interviews were undertaken with key staff during the project in order to gain insights about the organisational culture and to look for evidence of change processes initially, and in response to the eMM assessments. A face-to-face workshop was also held at each institution following the initial assessment in order to stimulate a response consistent with the eMM's model of organisational improvement.

The project deliverables are this report and four case studies describing the different approaches and experiences these institutions have had, illustrated and supported by the eMM capability assessments. Each institution has also received a confidential eMM report with the detailed assessment for 2010 and 2011.

Key Findings

The successful use of technology in tertiary education combines both practical and organisational issues and decisions. In each case the eMM assessments undertaken in this project identified significant operational issues with the use of technology by the individual

institutions. Many of these were able to be addressed through minor initiatives once the issues were drawn to the attention of the correct people.

The focus of the project was, however, on the wider organisational response to technology. The analysis presented in this report suggests that leaders need to consider a set of key factors when considering how their institution can change and respond to the opportunities offered by technology, namely:

- **Time.** Allowing sufficient time for experience and systems to develop to the point that they can support change and also being able to sustain the rapid pace of change flowing from success
- **Leadership.** Maintaining the strength and clarity of leadership while also allowing for models of shared leadership and engagement consistent with collegiality and participatory innovation
- **Strategic and operational outcomes.** Identifying clear operational benefits from the use of technology and associated changes and having a robust strategy able to support their achievement and the confidence to maintain that strategy despite external and internal challenges
- **External coercion.** Recognising and managing the threats and opportunities arising from the actions of external actors in the sector, in particular government agencies
- **Chance.** Being able to manage the random events that affect organisations with effective risk-management strategies and an organisational agility able to respond in a timely and positive manner to unexpected situations.

Implications for Organisational Change and New Zealand Tertiary Education

Despite the important choices facing the sector (Davis *et al.*, 2012), New Zealand appears to have struggled to define sustainable strategies for transformative higher education. Ten years after *Highways and Pathways* there is still the need to develop national strategies for e-learning that go beyond infrastructure to consider wider issues of learning design and flexibility that promote wider access and improve educational outcomes for individuals.

The Tertiary Education Commission (TEC) performance indicators (Tertiary Education Commission [TEC], 2011) may have had a positive influence on institutional management throughout the sector but they also are measures of activity at a very high level of abstraction and fail to motivate any change in pedagogy, including the role played by technology. The government caps on student numbers (TEC, 2009), imposed essentially to minimise the public cost of tertiary education, are also acting as a negative incentive to the adoption of technology. One of the clearest benefits of e-learning is the ability to increase the scale of education, increasing access by more students including those with other commitments such as employment or families. However, the Government has prevented institutional growth.

Institutions are now forced to consider how they can increase their internal efficiency in order to manage inevitable cost increases. Adoption of technology that increases costs even for transitional periods is increasingly hard to justify, particularly if it requires a degree of risk, as innovation inevitably does. This project highlights the need to adopt a systems-level view of e-learning (Seddon, 2008) rather than a technology- or performance-driven model. New Zealand tertiary education needs a return of a transformative vision such as that of the *Highways and Pathways* report if much of the potential of e-learning is to be realised. The eMM model is intended to help organisations realise the benefits of technological

innovation and transformation through systemic and strategic organisational change, but there needs to be a reason for institutional leaders to take what appears to be a risky step. The results from these case studies both illustrate the possible positive outcomes of change and also show some of the reasons why it is necessary, or even inevitable.

Introduction

Technology and Organisational Change

The Motivation for Change

The Government has identified the need for New Zealand institutions to make effective use of technology if they are to maintain their relevance over the coming decades (MED, 2008). Technology is seen as both driving the need for skills' development and also supporting skills' development for the New Zealand economy (New Zealand Treasury, 2008). Most recently this focus on technology has been reflected in the linkages made between education and the \$1.5 billion investment in the national ultrafast broadband network. Providing a high-speed network is only an enabler of change. It is necessary, but not sufficient in itself, to see the experience of students and staff change, and just as likely to generate little substantive change in the quality or efficiency of the education system.

Prior to the increase in available bandwidth and services that characterise the modern urban Internet, technology was expected to deliver significant changes inevitably as the scale and connectedness grew globally. In 1997 the vice-chancellor of The University of Melbourne was quoted on how technology would impact Australian higher education over the forthcoming decade:

Most formidably, the challenge to established universities will come from the international giants of the communications, information technology and multimedia industries ... Quality in the resulting 'global virtual universities' will be high, standardisation will create cost structures that are mightily competitive, brand recognition will be obtained (Professor Alan Gilbert, Vice-Chancellor, The University of Melbourne, quoted in Cunningham et al., 1997, p1).

Analysis of the likely impact on university education conducted at the same time (Cunningham *et al.*, 1997, p7) suggested that six major factors could potentially influence the institutions and the student experience. These factors were globalisation, digital media and information technologies, public sector reform, the social context of different delivery modes, and the possible emergence of virtual universities. The analysis concluded that higher education presented challenges to entrepreneurs and that consequently success (and thus competition with established providers) was likely only in very clearly defined niches or markets.

This analysis and the sense that technology is a high-risk area are apparent in experiences over the last decade. The many failures and successes in only very limited cases (Bacsich, 2005a; HCESC, 2005; Conole *et al.*, 2004; Taylor, 2001; Kenny, 2001; Radloff, 2001) demonstrate the need for careful leadership and an awareness of the risks and limitations of technology use, combined with a very robust understanding of the needs and expectations of students. The inability of the United Kingdom Open University to translate its initial success beyond the UK (Bacsich, 2005a; Keegan *et al.*, 2007) when moving to new contexts, such as the failed United States Open University (Meyer, 2006), suggests that changing the nature of provision is a complex and high-risk endeavour.

Despite the failures, technology is widely recognised as driving a re-examination of practice within higher education (Katz, 2008). E-learning offers clear and significant benefits to students learning either online or in a technology-supported mode (Kennedy *et al.*, 2009; USDE, 2009; Anon, 2010). The *Effective Practice in a Digital Age* report (JISC, 2009) notes

that e-learning is no longer a specialist area and needs to be seen as a mainstream activity influencing how learning can be enhanced for all students. UNESCO has also identified the significant potential for e-learning to support transnational and cost-effective education (Redden, 2009). The Australian Government's Bradley review of Higher Education (Bradley *et al.*, 2008, p79) includes in its definition of a quality student experience in higher education the need for "an accessible and sophisticated online learning environment".

In 2002, the *Highways and Pathways* document (Butterfield *et al.*, 2002) was published, setting out a vision for e-learning in New Zealand. This vision included a recognition of the role that e-learning could play in supporting the success of all New Zealanders through increasing access and affordability. It also noted that e-learning could play a significant role in the development of Māori education.

Anderson *et al.* (2006) in their review of policy development noted that at that time New Zealand was engaging well with key policy challenges posed by e-learning. They typified such policy engagement as having three phases:

The first stage occurs as governments act to make e-learning possible, the second as they work to integrate e-learning into the education system, effectively, to mainstream e-learning. In the third stage a transformative role for e-learning is seen, with changes to views of learning and to the nature and operation of the tertiary institutions and the tertiary system (Anderson *et al.*, 2006, p i).

Sadly much of the wisdom of the *Highways and Pathways* report seems to have been lost with little evidence in the current tertiary education strategies of the focus it originally stimulated. New Zealand appears to have struggled to pass from Anderson *et al.*'s second phase into one of transformation. Ten years later, there is still the need to develop national strategies for e-learning that go beyond infrastructure to consider wider issues of learning design and flexibility that promote wider access and improve educational outcomes for individuals.

This is unfortunate as e-learning offers many potential benefits to Māori and Pasifika students, students with special needs, and adult students who have struggled in the mainstream education system (Davis and Fletcher, 2010; Greenwood *et al.*, 2011). The changes in education policy in the 1990s led to a significant growth in student numbers in tertiary education (Abbott, 2006), much of it at sub-degree level, and it is clear that entire parts of the sector have failed to understand the role that technology could have played in supporting the success of these new students (Clayton and Elliot, 2007).

Rather than transformation of outcomes, the development of technology infrastructure currently appears to be the Government's main focus with the new 'Ultrafast Broadband' initiative seen as essential for New Zealand's future success. Access to faster connections and greater bandwidth is described as having "the potential to enhance student engagement and ultimately improve outcomes for students" (<http://www.minedu.govt.nz/theMinistry/EducationInitiatives/UFBIInSchools/QuestionsAndAnswers.aspx>).

The Government is not alone in this focus on the creation of infrastructure rather than its use. Development and maintenance of an effective technology infrastructure also remains a key strategic focus for university leaders (Allen and Seaman, 2010; McCarthy and Samors, 2009), even as IT systems have become mainstream and potentially strategically irrelevant

(as distinguishing factors in driving success) for many administrative and research activities (Carr, 2003; Chester, 2006). The recent New Zealand *Horizon* report (Johnson *et al.*, 2011, p3) identified several key challenges facing educational institutions in New Zealand and globally. These challenges did not include the technology infrastructure, but rather the need for staff development and support in understanding how technologies can improve learning.

The *Horizon* report also noted the need for pedagogical models to evolve to reflect new models of information use and expectations including the de-emphasis on recall and memorisation and the focus on collaboration and openness inherent to many new technologies. Technology is seen by some as offering, even requiring, new methods of education (Conole, 2010; Masoumi and Lindstrom, 2011) but achieving this may well require comprehensive changes in the culture of higher education (Ehlers and Schneckenberg, 2010). This need for transformation, absent from New Zealand tertiary education recently, may explain why large-scale changes in the experience of learning and teaching enabled by technology are, unfortunately, still rare.

Another reason for the lack of change in the educational systems experienced by students may be simply that – absent transformation – there is relatively little evidence of technology in itself resulting in improved educational outcomes for students (Conole, 2000; United States General Accounting Office, 2003; Kenny, 2001; Means, Toyama, Murphy, Bakia and Jones, 2009; Radloff, 2001; Taylor, 2001; Zemsky and Massy, 2004), as distinguished from the impact of changing course designs (for example, Lovett *et al.*, 2008).

It is reasonable to repeat the observation, made in the context of the “no significant difference” literature (Russell, 2001; Ramage, 2002), that if no changes are made to the pedagogy, or the learning activities, assessments and expectations of students, then why should there be any change in the outcomes? The reality is that measuring qualitative and quantitative changes in the quality of education is challenging (Knight, 2002; Ewell, 2010; Coates and Seifert, 2011) and the field is generally characterised by poor research design and limited empirical evidence (Conole *et al.*, 2004; Mitchel, 2000; Phipps, 1999). Consequently, it can be hard to justify the expense and disruption of change to sceptical and overworked organisation leaders, colleagues and other stakeholders, particularly when other aspects of tertiary education are subject to specific, if flawed, measures and consequences.

Change and the Demand for Tertiary Education

Given this background context, it is reasonable to ask whether tertiary education institutions should contemplate changes in their educational activities beyond the ongoing modernisation of the supporting infrastructure. Demand for tertiary qualifications is strong and accredited qualifications are accepted internationally, providing students with opportunities to travel and seek employment in many industries. Economic analysis of the historical benefits of degrees shows a significant financial benefit to students obtaining degrees irrespective of the provider (Nair *et al.*, 2007), although it must be admitted that this benefit may not be true in a future where a degree is no longer reserved for the few. The stability of the current models of education and the lack of change resulting from technology may simply be a reflection of their utility and inherent robustness. The oft-quoted statement by Clark Kerr then becomes an acknowledgement of value rather than a problem to be addressed:

About 85 institutions in the Western World established by 1520 still exist in recognizable forms, with similar functions and with unbroken histories, including the Catholic Church, the

Parliaments of the Isle of Man, of Iceland, and of Great Britain, several Swiss cantons, and...70 universities (Kerr, 1987, p184).

In fact, there has been a significant change in tertiary education in New Zealand, as well as internationally. Once the preserve of a small minority, degree education has grown to become a mainstream activity with just under 13 percent of the adult population engaged in study annually (Ministry of Education, Education Counts <http://www.educationcounts.govt.nz/>) and degrees being offered by a variety of providers. Possession of a degree is seen as a necessary qualification for a successful adult life in many countries. New Zealand degrees can be obtained from universities, but also from institutes of technology or polytechnics (ITPs), indigenous wānanga, and private training establishments (PTEs). Despite this expansion in provision, governments remain conscious of the need to educate adults failed even by the current providers (House of Commons Public Accounts Committee, 2009).

Internationally many countries are seeking solutions to the problem of educating a population without the resources or opportunities of traditional university education (Daniel, Kanwar and Uvalic-Trumbic, 2009). These pressures are driving change for financial reasons and using methods that focus on cost, inevitably increasing the scrutiny and political activity around accountability for public funds. This is not limited to the public sector with for-profit providers made to comply with legislative and regulatory controls aimed at ensuring public funds are rigorously accounted for (Tierney and Hentschke, 2007). In New Zealand the focus on costs has seen the Treasury recommend that the Government not expand access to degree-level education but rather increase opportunities for skilled migration (Treasury, 2008). The tensions between an accountability model focused on the needs of stakeholders rather than the academy, and the pressure for cost efficiencies realised through standardised models rather than customised education have been used to generate scenarios for the future of education in New Zealand (Davis *et al.*, 2012). These scenarios illustrate the uncertainty facing the sector and the reality of change that is likely to result.

The pace of technological change also needs to be recognised. Over the next 100 years it has been suggested that our societies are likely to experience the same level of technological development as has been experienced over the last 20,000 years (Kurzweil, 2005, p50). Much of the change experienced over the last decade has been in our ability to access information and communicate, and there is nothing to indicate that significant and accelerating changes won't continue to occur over the next decade and beyond. Developments in artificial intelligence are even (finally) starting to generate plausible accounts of 'teaching machines' that can take the place of teachers in some contexts (Fishman, 2011).

A final complication is that education institutions exist in society with a range of purposes, participants and audiences. Change inevitably affects different stakeholders differently, even inconsistently, and consequently institutions are pressured continuously to change or resist change (Kerr, 2005; Marginson, 2004). This complex set of contradictory expectations makes the management of institutions challenging, often rendering simple measures such as profit meaningless, an observation that remains relevant many years after having first been made (Perkins, 1973, p12).

Leaders of institutions need to be able to distinguish between the visible and superficial uses of technology (evidence of activity), and the impact that the technology is having on

strategic and operational outcomes (evidence of impact). It is now well recognised that organisations' use of technology is not itself a distinguishing feature, rather it is the execution of the way technology changes and continues to change the activities of the organisation (Carr, 2003; Hamel and Välikangas, 2003). It is all too easy to slip into the error of regarding measures of activity (performance indicators) as measures of the quality of work being done and the value of the outcomes being produced, despite the evidence that many performance indicators used in education are unreliable or unhelpful (Barnetson and Cutright, 2000; Gibbs, 2010; Harvey and Williams, 2010). The impact of technology is not currently apparent in changes to the quality of outcomes but rather seen in the instrumentation of existing models. Seddon (2008) suggests that this can be avoided by treating a complex endeavour as a complete system and by focusing on measures that reflect the value of the overall process seen in delivered outcomes, rather than aspects that embody pre-existing activities.

Typology of Organisational Change

Higher education increasingly shows many of the characteristics of failed organisations noted by Seddon (2008), particularly the focus on performance targets and managerial systems, with much of the change from technology simply being used to mechanise existing procedures or tasks. This type of change is described as a 'Sustaining' innovation by Christensen *et al.* (2004). Sustaining innovations improve aspects of a business, service or product by extending existing characteristics in desirable ways. This can result from technological changes such as the use of faster or cheaper computers, better resolution of display materials and the reduction in the power consumption. The key to understanding this form of innovation is that it doesn't question any presumptions about how the organisation functions, and may even reinforce traditional models.

Christensen's model also identifies two other forms change can take as 'New-Market Disruptive' and 'Low-End Disruptive' innovation. New-Market Disruptive innovations are perhaps what most people think of when considering innovation in technology. New-Market Disruptive innovations make it possible for users to engage in activities that were not previously practicable or possible. Online delivery of degrees is potentially a New-Market Disruption, although the many failures apparent suggest that realisation of the potential for innovation has exceeded the capabilities of existing providers (Cunningham *et al.*, 2000; Keegan *et al.*, 2007).

Low-End Disruptive innovations can occur when the existing products or services exceed the needs of a significant customer base, and thus can be provided in ways that reduce financial or other costs of obtaining the desired outcome. The creation of low-cost laptops, or NetBooks, is an example of this form of innovation in the computer industry. Interestingly, online degree provision could also potentially be an example of Low-End Disruptive innovation, if the model adopted the approach of removing unnecessary elements of the learning experience and thus reduced the costs experienced by students.

Christensen *et al.* (2004, p99) identify higher education as an industry where there is significant potential for disruptive innovation. Technology offers the potential of simultaneously driving both New-Market innovation of the type described by The University of Melbourne's vice-chancellor earlier, and the Low-End disruption embodied in for-profit online providers (Tierney and Hentschke, 2007). Limiting such innovations initially to specific niches, such as specific qualifications or types of students, potentially increases the likelihood of success, as larger competitors are not attracted by the small size of the niche markets and smaller firms are more likely to be flexible and able to access resources

sufficient for operations within the niche scale. Experience and successful models can then be potentially translated into operations in related niches or over a larger market, in more direct competition with larger enterprises that are less experienced in the new modes of operation. It can be argued that larger institutions can afford to fund small-scale innovation in specific areas, but experience suggests these small innovations are lost in the larger organisational context unless systems are in place to recognise and build on them.

Christensen's model suggests that large organisations, including educational institutions, tend not to engage with disruptive innovations as they regard themselves as already successful using current technologies and methods; a perception reinforced by the commonly used performance measures and focus on the perceptions of students who are already clients of the institution. Collins and Porras (1994) suggest that such large organisations are successful in their ability to change and innovate by identifying a 'core ideology' that underpins the success of the organisation, while also balancing that ideology with mechanisms that stimulate change consistent with that ideology (Figure 1). The lack of change in education resulting from technology then becomes a symptom of institutions mistaking the ways they have structured learning and teaching as their core ideology, rather than seeing these as tools that support and sustain the growth of that ideology.



Figure 1: Balancing 'core ideology' with the stimulation of change (Collins and Porras, 1994).

Given this analysis, as well as the experience from previous benchmarking (Marshall, 2010a), it is possible to conclude that many educational organisations may be currently unable to make purposeful change to their activities without the application of external pressure from governments and regulatory agencies. Change imposed from such sources is described as *coercive isomorphism* by DiMaggio and Powell (1983). Coercive isomorphism is seen in the large-scale changes in education policy and funding, as well as in the quality and audit activities evident in the United Kingdom, Australia and New Zealand over the last decades.

In addition to the larger issues of the motivations for change and the culture that enables or inhibits it, there is the reality that most organisations are sufficiently complex that change cannot be seen as a single entity or event. Inevitably, multiple changes occur simultaneously. As a result there are a multitude of change models in the literature that characterise change by scale, pace and impetus (By, 2005; Demers, 2007; Seel, 2007). Impetus and pace have already been explored above, but much of the literature describes educational uses of technology operating a very limited scale, that of the individual innovator or early adopter (Rogers, 2003). Many institutions have supported early-adopter initiatives through project funds; however, leadership, systems and a supportive climate for change are essential if this investment is to be translated into change at any greater scale (Southwell *et al.*, 2005). Recognition of the complex nature of the environment that education institutions operate within is leading to the development of 'ecological' models

(Davis, 2010; Davis, 2012) that explicitly address the dynamic interactions between internal and external stakeholders and systems.

Key Factors Supporting Organisational Change in Response to Technology

The complexity of the issues facing educational institutions intending to make effective use of technology for learning and teaching is illustrated by the range of issues identified in the *Taking the Lead* project (Higgins and Prebble, 2008), and in Bates and Sangrà (2011), which examines the experience of 11 European and North American public universities.

The *Taking the Lead* project developed a “set of resources and tools that will assist institutional leaders to plan and manage their use of e-learning more strategically” (Higgins and Prebble, 2008, p3). The materials identified the need for management consideration of a wide range of issues or themes:

- Institutional strategy, planning and policies
- Market positioning and identification for e-learning
- Organisational structures
- Resourcing
- Collaborative relationships with other institutions
- Staff development, instructional design and course development
- Teaching and learning models and alignment with e-learning
- Student support
- Enduring the reliability and validity of e-learning assessment and moderation
- Technological infrastructure.

Bates and Sangrà (2011), in their international study of innovative educational institutions, identified the following areas as important components of the response to the challenge posed by technology:

- Institutional planning and strategy
- Leadership
- Operational planning at the programme level
- Organizational structures
- Quality management and evaluation
- Financial management
- Organizational culture
- The role of Government.

Unsurprisingly, while the language used is different, there is a very strong degree of overlap in the issues and areas identified. These analyses illustrate the range of organisational activities and systems that need to be understood and monitored as change occurs. Change in any one of these areas is likely to generate a range of changes throughout the others. Birnbaum’s (1988) cybernetic model of educational change recognised this complexity in the observation (p205) that a step-change is only easy for leaders when their institution is either:

- in a state of acknowledged crisis
- small
- conspicuously out of date, or
- led by an autocrat.

Short of precipitating a crisis or adopting a style of management inconsistent with the values of most educational institutions, there is thus inevitably a need for change strategies that can operate simultaneously and synergistically at multiple levels (Moore, 2006; Russell, 2009; Southwell *et al.*, 2005) and which consider the entire system holistically (Seddon, 2008). As Birnbaum notes:

Simple understandings lead to general rules to be applied in all situations; complicated understandings suggest that situations differ and that reliance on experiences of the past may prove dysfunctional. [...] Only complicated understandings can see the many and conflicting realities of complicated situations (Birnbaum, 1988, p209).

Recognition of the need to respect complex understandings led to the development of a model of e-learning capability that serves as an analytical tool for supporting change in education stimulated by technology – the e-learning maturity model – which is discussed below.

The E-Learning Maturity Model

Introduction

The e-Learning Maturity Model (eMM) (Marshall and Mitchell, 2002, 2003, 2004, 2005, 2006, 2007; Marshall, 2010a; 2010b; 2011; <http://www.utdc.vuw.ac.nz/research/emm/>) provides a quality improvement framework by which institutions can assess and compare their capability to sustainably develop, deploy and support e-learning. The eMM is a tool for assessing current capability as well as an analysis framework intended to stimulate and support organisational change. The extensive set of processes and practices is intended to act as a knowledge base for organisations selecting activities for improvement, based on strengths and weaknesses identified in their own and other organisational capability assessments. Explicitly, the eMM is intended to ensure that change processes are stimulated and supported by recognition of the capability of the organisation as a complete system. While capability is presented as a series of individual processes, the process capabilities are interlinked by a web of shared practices and by the unifying lens of the dimensions applied to each process, as described below.

The eMM was inspired by the Capability Maturity Model (CMM, Paulk *et al.*, 1993) and SPICE (Software Process Improvement and Capability dEtermination, El Emam *et al.*, 1998; Software Process Improvement and Capability dEtermination, 2002). The underlying idea is that the ability of an institution to be effective in a particular area of work depends on its capability to combine high-quality processes into systems that are reproducible, and able to be sustained and built upon. Essentially, it proposes that successful organisations grow and develop maturity over time like living organisms. The characteristics of an institution that enable high-quality processes and consequent success are to some extent able to be separated from implementation details that vary depending on particular circumstances. This separation means that an e-learning capability analysis can be done independently of the technologies selected and pedagogies applied.

Maturity models like the eMM have been shown (Systems Engineering Capability Assessment Training, 1988) to assist organisations that want answers to questions like:

- Is the organisation successful at learning from past mistakes?
- Is it clear that the organisation is spending limited resources effectively?

- Does everyone agree which problems within the organisation are the highest priorities?
- Does the organisation have a clear picture of how it will improve its processes?

A key aspect of the eMM is that it does not rank institutions, but rather acknowledges the reality that all institutions have aspects of strength and weakness that can be learned from and improved. The rapid growth in the technologies being used, the ways that they are being applied across an ever widening group of academic disciplines, and the evolving skills and experience of teachers and students means that e-learning is a moving target. Any benchmarking approach that presumes particular e-learning technologies or pedagogies is unlikely to meaningfully assess a range of institutions within a single country, let alone allow for useful international collaboration and comparison, particularly over an extended period of time.

As a consequence of the desire for the eMM to support technological and organisational change, the meaning of e-learning implicit in the eMM is broadly defined. At the heart lies the impact of computers and related communication technologies on the range of activities traditionally undertaken by teachers and learners. However, as the eMM is institutionally focused, the model considers the wider implications of the use of digital technology, most particularly the systems and resources needed to ensure that the use of technology by students and teachers is efficient, effective, and can be sustained operationally and strategically. A point to emphasise is that eMM assessments are not about individual staff or their courses. It is about the environment the institution provides and the extent to which it is enabling staff to succeed, and where the institution could potentially invest resources to improve the experiences of students and staff.

Key Concepts of the eMM

Capability

Capability describes the ability of an institution to ensure that e-learning design, development and deployment is meeting the needs of the students, staff and institution. Critically, capability includes the ability of an institution to *sustain* e-learning delivery and the support of learning and teaching as demand grows and staff change.

Processes and Practices

The eMM divides the capability of organisations to sustain and deliver e-learning into 35 processes grouped into five major categories or process areas (Table 1). It should be noted that all of the processes are interrelated to some degree, particularly through shared practices and the perspectives of the five dimensions. Each process in the eMM is defined within each dimension by practices (Figure 2). The practice statements attempt to capture directly measurable activities for each process and dimension. Table 2 below illustrates the complete practice set for one process, extracted from the process guide (Marshall, 2006b).

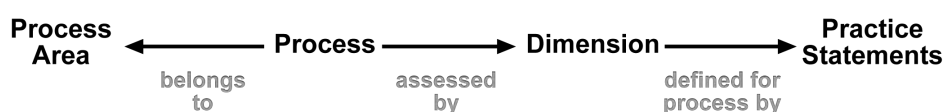


Figure 2: Relationships between processes, practices and dimensions

Table 1: eMM Version 2.3 Processes (revised from Marshall, 2006b)

Learning: Processes that directly impact on pedagogical aspects of e-learning	
L1.	Learning objectives guide the design and implementation of courses.
L2.	Students are provided with mechanisms for interaction with teaching staff and other students.
L3.	Students are provided with e-learning skill development.
L4.	Students are provided with expected staff response times to student communications.
L5.	Students receive feedback on their performance within courses.
L6.	Students are provided with support in developing research and information literacy skills.
L7.	Learning designs and activities actively engage students.
L8.	Assessment is designed to progressively build student competence.
L9.	Student work is subject to specified timetables and deadlines.
L10.	Courses are designed to support diverse learning styles and learner capabilities.
Development: Processes surrounding the creation and maintenance of e-learning resources	
D1.	Teaching staff are provided with design and development support when engaging in e-learning.
D2.	Course development, design and delivery are guided by e-learning procedures and standards.
D3.	An explicit plan links e-learning technology, pedagogy and content used in courses.
D4.	Courses are designed to support disabled students.
D5.	All elements of the physical e-learning infrastructure are reliable, robust and sufficient.
D6.	All elements of the physical e-learning infrastructure are integrated using defined standards.
D7.	E-learning resources are designed and managed to maximise reuse.
Support: Processes surrounding the support and operational management of e-learning	
S1.	Students are provided with technical assistance when engaging in e-learning.
S2.	Students are provided with library facilities when engaging in e-learning.
S3.	Student enquiries, questions and complaints are collected and managed formally.
S4.	Students are provided with personal and learning support services when engaging in e-learning.
S5.	Teaching staff are provided with e-learning pedagogical support and professional development.
S6.	Teaching staff are provided with technical support in using digital information created by students.
Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle	
E1.	Students are able to provide regular feedback on the quality and effectiveness of their e-learning experience.
E2.	Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience.
E3.	Regular reviews of the e-learning aspects of courses are conducted.
Organisation: Processes associated with institutional planning and management	
O1.	Formal criteria guide the allocation of resources for e-learning design, development and delivery.
O2.	Institutional learning and teaching policy and strategy explicitly address e-learning.
O3.	E-learning technology decisions are guided by an explicit plan.
O4.	Digital information use is guided by an institutional information integrity plan.
O5.	E-learning initiatives are guided by explicit development plans.
O6.	Students are provided with information on e-learning technologies prior to starting courses.
O7.	Students are provided with information on e-learning pedagogies prior to starting courses.
O8.	Students are provided with administration information prior to starting courses.
O9.	E-learning initiatives are guided by institutional strategies and operational plans.

Table 2: Practice statements for process L1 (revised from Marshall, 2006b)

L1. Learning objectives guide the design and implementation of courses
Delivery
Course documentation includes a clear statement of learning objectives.
Learning objectives are linked explicitly throughout learning and assessment activities using consistent language.
Learning objectives are linked explicitly to wider programme or institutional objectives.
Learning objectives support student outcomes beyond the recall of information.
Course workload expectations and assessment tasks are consistent with course learning objectives.
Planning
Course documentation templates require the clear statement of learning objectives.
Learning objectives guide e-learning design and (re)development decisions regarding content and activities.
Learning objectives guide e-learning design and (re)development decisions regarding technology and pedagogy.
Institutional reviews monitor the linkages between course learning objectives and wider programme or institutional objectives.
Institutional reviews are guided by course learning objectives when assessing course structure, learning design and content.
E-learning design and (re)development are guided by a researched evidence base of effective learning objectives and associated e-learning activities.
E-learning design and (re)development plans formally link learning objectives to institutional strategic and operational plans.
Staff are provided with assistance when engaged in e-learning design and (re)development.
Definition
Institutional policies require that a formal statement of learning objectives is part of all course documentation provided to students.
Teaching staff are provided with support resources (including training, guidelines and examples) on developing learning objectives that address the full range of cognitive outcomes appropriate to the discipline, pedagogical approach and students.
Teaching staff are provided with support resources (including training, guidelines and examples) on using learning objectives to guide e-learning design and (re)development.
Teaching staff are provided with support resources (including training, guidelines and examples) on assessing student achievement of learning objectives.
Institutional e-learning policies are guided by institutional learning objectives for all students.
Staff are provided with a researched evidence base of effective learning objectives and associated e-learning activities.
Management
Compliance with policies, standards and guidelines governing the incorporation of learning objectives in e-learning design and development activities is regularly monitored.
A variety of qualitative and quantitative metrics are used to assess student achievement of course learning objectives.
Course learning objectives are regularly monitored to ensure that they address the full range of cognitive outcomes.
Course learning objectives are regularly monitored to ensure that they are effective.
E-learning design and (re)development activities are subject to formal quality assurance reviews at key milestones.
Financial costs and benefits of delivering course learning objectives are regularly monitored.
Feedback is collected regularly from students regarding the effectiveness of e-learning activities.
Feedback is collected regularly from staff regarding the effectiveness of e-learning activities.
Optimisation
Information on student achievement of learning objectives guides e-learning design and (re)development.
Institutional learning objectives are guided by learning and teaching strategic plans.

Dimensions of Capability

The eMM assesses capability on five dimensions (Marshall and Mitchell, 2006). Rather than levels, which imply a hierarchical model of process improvement where capability is assessed and built in a layered and progressive manner, the concept underlying the eMM's use of dimensions is holistic capability. Each process is assessed from the synergistic perspectives of *Delivery, Planning, Definition, Management and Optimisation* (Figure 3).

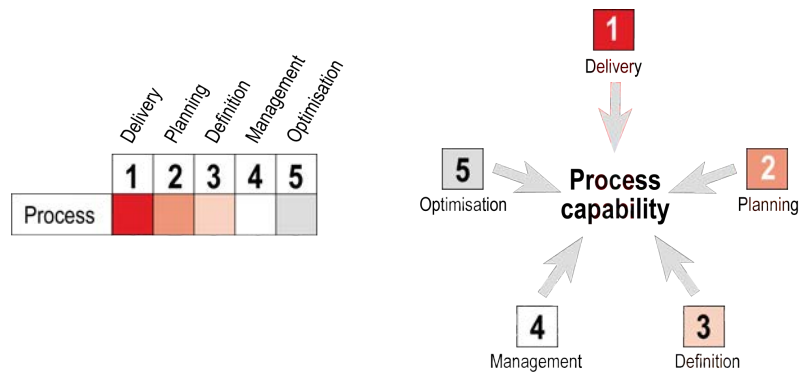


Figure 3: eMM Process Dimensions

The **Delivery** dimension is concerned with the creation and provision of process outcomes. Assessments of this dimension are aimed at determining the extent to which the process is seen to operate within the institution.

The **Planning** dimension assesses the use of predefined objectives and plans in conducting the work of the process. The use of predefined plans potentially makes processes more able to be managed effectively and reproduced if successful.

The **Definition** dimension covers the use of institutionally defined and documented standards, guidelines, templates and policies during the process implementation. An institution operating effectively within this dimension has defined clearly how a given process should be performed. This does not mean that the staff of the institution follow this guidance.

The **Management** dimension is concerned with how the institution manages the process implementation and ensures the quality of the outcomes. Capability within this dimension reflects the measurement and control of process outcomes.

The **Optimisation** dimension captures the extent to which an institution is using formal approaches to improve the activities of the process. Capability of this dimension reflects a culture of continuous improvement.

An organisation that has developed capability on all dimensions for all processes will be more capable than one that has not. Strong capability at particular dimensions that is not supported by capability at the other dimensions will not deliver the desired process outcomes.

Capability Assessment Criteria

Each practice (for example, Table 2) is rated for performance during an assessment from *Not Adequate* to *Fully Adequate* (Figure 4) by an external assessor. The ratings at each dimension are made on the basis of the evidence collected from the institution and are a combination of whether or not the practice is performed, how well it appears to be functioning, and how prevalent it appears to be. For example, the assessment of the practice “Course documentation includes a clear statement of learning objectives” is done by examining the course documents for the sampled courses, looking for clear statements of learning objectives. The assessor can refer to the detailed information on the individual practices (for example, http://www.cad.vuw.ac.nz/emmWiki/index.php/L1_1_1) to help decide the rating for the practice.

<input type="checkbox"/>	Not practised/not adequate
<input type="checkbox"/>	Partially adequate
<input type="checkbox"/>	Largely adequate
<input type="checkbox"/>	Fully adequate
<input type="checkbox"/>	Not assessed

Figure 4: eMM capability assessment ratings (based on Marshall and Mitchell, 2003)

Once each practice has been assessed, the results are averaged and rounded down to give the rating for the given dimension of the process. This average is what appears in the eMM summary visualisations (also known as carpets). In the example shown in Figure 5, the overall assessment for the delivery dimension would be *Partially Adequate*.

Process L1: Learning objectives guide the design and implementation of courses (Delivery Dimension)		
Assessment	Practices	
<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Course documentation includes a clear statement of learning objectives. Learning objectives are linked explicitly throughout learning and assessment activities using consistent language.

Figure 5: Example eMM practice capability assessment

Each of the five dimensions of an individual process is specified by assessment of each of the practices (see Table 2 for an example of those for one process). Figure 6 below shows an example of how individual institutional process capabilities can be interpreted.

Process description	Delivery	Planning	Definition	Management	Optimisation
Institution A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Institution B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Institution C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Institution D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 6: Example of eMM process capability assessment

Looking at the summary assessments in Figure 6, it can be seen that institution A is not performing the process well, with only evidence of *ad hoc* attempts shown by the *Partially Adequate* rating (light blue) supplied for the *Delivery* dimension and the absence of any capability in the other dimensions.

Institution B is significantly more capable in the process than either institutions A or C, with evidence that the process is mostly performed well (the dark blue *Largely Adequate* rating at the *Delivery* dimension) and in a planned fashion (the *Largely Adequate* rating of the *Planning* dimension). Note that despite there being evidence of planning, this appears to be done without any attempt for consistency throughout the institution as no capability is shown within the *Definition* dimension.

Institution C, on the other hand, while not as capable in the performance of this process as institution B, shows evidence of having defined standards or guidelines for performing the process (the *Definition* dimension). These appear not to be having an impact on actual e-learning projects as shown by the lower assessments for the *Delivery* and *Planning* dimensions.

Institution D shows a pattern of very good performance of the process (black *Fully Adequate* rating for the *Delivery* dimension), supported by *Largely Adequate Planning* dimension capability and an initial set of standards or guidelines (*Partially Adequate* rating in the *Definition* dimension). This is a common pattern of capability development, building from a base of process application behaviours that are becoming more standardised as the institution gains more experience.

Further analysis of these example results suggests that institution C will provide potential examples of useful standards, guidelines and policies, while institution D (and to some extent B) will provide individual examples of how to perform the process well. This type of analysis can be used across a number of processes and institutions within a sector to identify potentially useful approaches that are successful in the shared context and that can be adopted by all institutions seeking to build e-learning capability. Systemic weaknesses, where no good practice can be identified in the assessed institutions, present opportunities for potential research or investment within institutions, as well as collaborative work within the sector and with regulatory or accrediting bodies.

Examination of process areas provides an institution with the ability to identify areas of related weakness that can be addressed strategically. Priorities can be easily identified by comparison with other institutions or by comparing process ratings within an institution. Figures 7 and 8 below show capability assessments for a selection of universities (Figure 7) and other tertiary providers (Figure 8) including the capabilities most recently determined in this study.

The patterns of light and dark (weak and strong capability) convey important information about the patterns of capability in the respective sectors. What is clear is that no institution is either completely black or completely white. Institutions that are very weak (University NZ-C in Figure 7, for example) have some processes that are *Fully Adequate* in some dimensions, while institutions that are very strong (PTE-A in Figure 8, for example) have processes that are not adequate in some dimensions.

These figures can also be examined to identify common or shared patterns of capability. For example, there is a consistent weakness in process D7 ("E-learning resources are designed

and managed to maximise reuse”). This reflects the lack of any formalised reuse systems in the institutions studied, and suggests that the concept of learning object repositories may be flawed in implementation. In contrast, all institutions are strong in process O8 (“Students are provided with administration information prior to starting courses”). This reflects the priority that institutions associate with administration, as well as the relative ease by which existing systems can support e-learning courses.

Within each institutional assessment there is also a generally clear pattern of stronger capability in the *Delivery* dimension (the left side of each column) and much weaker capability in the *Management* and *Optimisation* dimensions (the right side of each column). This is not unexpected, as it conveys the culture of *ad hoc* systems and individual innovation, as opposed to organisational and systematic engagement, that stimulated the development of the eMM in the first place.

Development of the eMM

The eMM was originally proposed (Marshall and Mitchell, 2002) in the form of a question. The original work concentrated on whether or not the Maturity Model concept offered a useful framework for the analysis of institutional e-learning activities and it tested whether it might provide useful insights for individual teachers as well as for organisations. This initial work was framed very strongly by the five maturity levels of the original CMM (Paulk *et al.*, 1993a; Paulk, 1996):

- **Initial:** The development process is characterized as *ad hoc*, and occasionally even chaotic. Few processes are defined, and success depends mainly on individual effort and heroics.
- **Repeatable:** Basic project management processes are established to track cost, schedule and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.
- **Defined:** Management and development activities are documented, standardized and integrated into a family of standard processes for the organization.
- **Managed:** Detailed measures of the process and product quality are collected so that the process and product are understood and controlled.
- **Optimizing:** Continuous process improvement is facilitated by feedback from the process and from piloting innovative ideas and technologies.

The early focus of the eMM research was on identification of a set of evidence-based processes that would provide useful guidance to individual practitioners as well as organisational leaders. These processes were first identified through mapping existing statements of good practice (Chickering and Gamson, 1987; Institute for Higher Education Policy, 2004) to learning-specific process areas (Marshall and Mitchell, 2003; 2004). This was later supplemented by an extensive review of e-learning literature funded by the Ministry of Education (Marshall, 2006b) and a series of workshops held internationally and attended by experts, practitioners and support staff (Marshall, 2008). The initial version of the model was also extensively reviewed and redeveloped in collaboration with the University of Manchester, in order to refine the scope, clarity and structure of the model and the processes embedded within it (Calverley *et al.*, 2007; Cappelli and Smithies, 2008). A key change identified in that work was the shift from the progressive model of the traditional CMM to the multi-dimensional approach now embodied in the eMM. This also saw the shift from the original hierarchical statements to the current practices, which specify the dimensional capability of processes.

	University NZ-A	University NZ-B	University NZ-C	University NZ-D	University NZ-E	University NZ-F	University NZ-G	University UK-A	University UK-B	University USA-A	University AUS-A	University AUS-B
Learning: Processes that directly impact on pedagogical aspects of e-learning												
L1. Learning objectives guide the design and implementation of courses												
L2. Students are provided with mechanisms for interaction with teaching staff and other students												
L3. Students are provided with e-learning skill development												
L4. Students are provided with expected staff response times to student communications												
L5. Students receive feedback on their performance within courses												
L6. Students are provided with support in developing research and information literacy skills												
L7. Learning designs and activities actively engage students												
L8. Assessment is designed to progressively build student competence												
L9. Assessment is subject to frequent formative and summative												
L10. Courses are designed to support diverse learning styles and learner capabilities												
Development: Processes surrounding the creation and maintenance of e-learning resources												
D1. Teaching staff are provided with design and development support when engaging in												
D2. Course development, design and delivery are guided by e-learning procedures and standards												
D3. An explicit plan links e-learning technology, pedagogy and content used in courses												
D4. Courses are designed to support disabled students												
D5. All elements of the physical e-learning infrastructure are reliable, robust and sufficient												
D6. All elements of the physical e-learning infrastructure are integrated using defined standards												
D7. E-learning resources are designed and managed to maintain a use												
Support: Processes surrounding the support and management of e-learning												
S1. Students are provided with technical assistance when engaging in e-learning												
S2. Students are provided with library facilities when engaging in e-learning												
S3. Student engagement and completion is considered and targeted formally												
S4. Students are provided with personal and learning support services when engaging in e-learning												
S5. Teaching staff are provided with e-learning pedagogical support and professional development												
S6. Teaching staff are provided with technical support in using digital information created by students												
Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle												
E1. Students are able to provide regular feedback on the quality and effectiveness of their e-learning experience												
E2. Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience												
E3. Regular reviews of the e-learning aspects of courses are conducted												
Organisation: Processes associated with institutional planning and management												
O1. Formal criteria guide the allocation of resources for e-learning design, development and delivery												
O2. Institutional learning and teaching policy and strategy explicitly address e-learning												
O3. E-learning technology decisions are guided by an explicit plan												
O4. Digital information skills is guided by an institutional information literacy plan												
O5. E-learning initiatives are guided by explicit development plans												
O6. Students are provided with information on e-learning technologies prior to starting courses												
O7. Students are provided with information on e-learning pedagogies prior to starting courses												
O8. Students are provided with administration information prior to starting courses												
O9. E-learning initiatives are guided by institutional strategies and operational plans												



Figure 7: University eMM capabilities

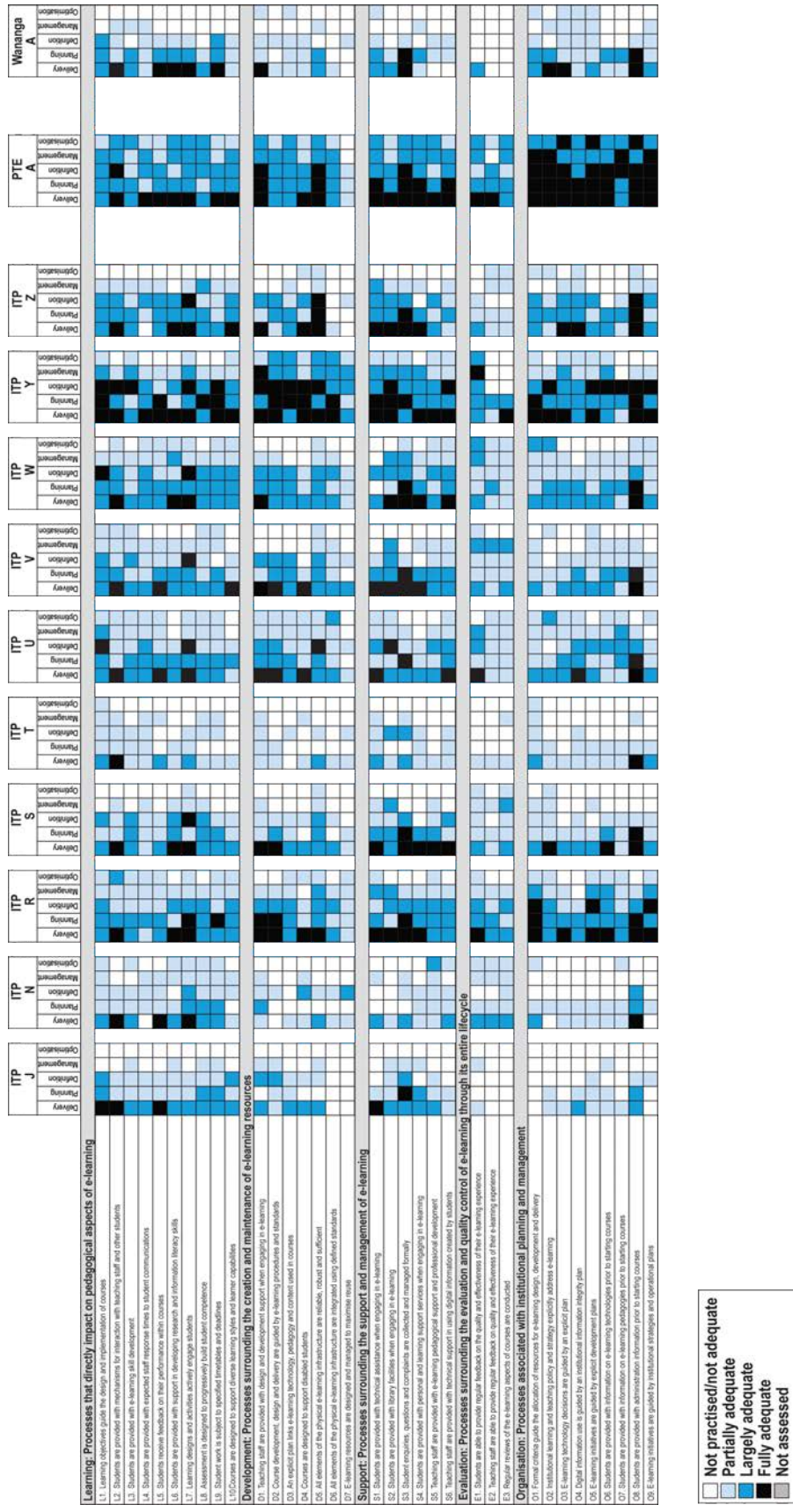


Figure 8: Non-university tertiary provider eMM capabilities

The development of the eMM was also informed by two New Zealand sector-wide assessment activities, one focused primarily on New Zealand universities (Marshall, 2005; 2006a), the second on the polytechnic sector (Neal and Marshall, 2008). These projects helped refine the materials used to undertake assessments and generated a body of examples of what institutions were doing to address the specific activities assessed by the eMM. A set of smaller projects were also undertaken in Australia (Beames *et al.*, 2009; Marshall *et al.*, 2009; Marshall, 2009), the United Kingdom (Sero, 2007; Bacsich, 2008; University of London, 2008) and the United States (Marshall *et al.*, 2008). These provided evidence that the eMM was applicable to a wide variety of educational institutions of different sizes and delivery models (including specialist distance providers). The work in Australia (Beames *et al.*, 2009) also generated evidence that the model provided very consistent results for large organisations where some variation across disciplines or faculties might have been expected.

The work with the New Zealand ITP sector (Neal and Marshall, 2008) provided an important eMM census of a sufficiently large sector. The scale of this project meant that a form of validation could be done of the eMM capability assessments through correlation with other organisational indicators and measurements. Examination of the assessments in conjunction with other information about the institutions resulted in the conclusion that eMM assessments were not affected by the size of the institution as measured by the number of students, nor was there any evidence that urban or rural situation affected capability. Factors which were correlated with a stronger assessment were overall operating budget, engagement in significant amounts of distance delivery, investment in a team of staff with a responsibility for e-learning, and having a clear strategic plan and purpose for e-learning. These last two were, in combination, very strongly correlated with eMM capability. This correlation is reasonable, suggesting that institutions generate stronger capability in activities where they have a clear goal and reason for doing them, and where staff time and energy are targeted at those activities in an accountable manner. As will be seen later, these factors have also been significant in the cases reported in this research.

The existing body of eMM assessments has resulted in the identification of common features of e-learning capability evident internationally (Marshall, 2010b). Educational institutions unsurprisingly show stronger capability for processes that are fundamental to all forms of delivery and core services of the organisation. Administrative systems and services such as the library show a consistently high capability. Activities that are under the direct control of individual staff, such as the way assessment or feedback is conducted, are also stronger than those that require a coordinated or organisational response, such as support for disabled students. Common themes include the investment in infrastructure such as learning management systems, but without a supporting investment in standards and policies or in training or evaluation of the impact such infrastructure has had on staff or students. Consistently, organisations have shown a pattern of minimal engagement in defining expectations for effective e-learning, little measurement of the quality of activities or outcomes, and an almost non-existent focus on continuous systematic improvement.

These findings are reflected in the advice to organisational leaders interested in improving capability that arose from the synthesis of the eMM assessments undertaken prior to the current study (Marshall, 2011):

- Have a reason for why e-learning is part of the institution's purpose for existence and be able to express this in strategic and operational activities

- Clearly identify in what ways existing e-learning support is impacting upon the staff and student experience
- Talk to the teaching and support staff and find out what prevents their making the best use of existing e-learning investments
- Communicate to students the ways that technology will be used to improve their learning experience and help them prepare themselves to take best advantage of the opportunities provided
- Formally assess staff skills in e-learning and target development resources strategically
- Look for ways to reduce the barriers that discourage informal sharing of e-learning resources, starting with open licensing models.

These lessons are clearly in line with those (discussed earlier) from the *Taking the Lead* project (Higgins and Prebble, 2008) and in Bates and Sangrà (2011). As a set, this advice constitutes a testable hypothesis or change process that can be examined by observing the impact advice framed in this form has on organisational change experiences and outcomes. This forms the main focus of the work reported here.

Benchmarking, quality improvement and performance measurement frameworks in E-learning

The desire to see improvements in the quality and impact of e-learning, combined with the modern focus on external performance management of higher education, has seen the development of a wider variety of instruments intended to support organisational measurements of one form or another. In part, the variety reflects the strongly contested nature of quality in higher education, with many academics resisting the sense that their work can be improved through the application of tools and approaches developed in other contexts (Newton, 2000; Tam, 2001; Anderson, 2006; Ehlers and Pawlowski, 2006).

At the most basic level there are quality ‘marks’ intended to identify an educational product or organisation as being of reputable quality and utility. Examples include the recently launched European eprobate initiative (<http://epprobate.com/>), the European University Quality in eLearning (UNIQUE) label (<http://www.qualityfoundation.org/unique-certification>) and the E-xcellence Associates label (discussed below). These marks are generally dominated by product quality criteria such as content, media and pedagogical design, equivalent to the *Delivery* dimension of the eMM (particularly the *Learning* and *Development* processes), but can also focus on measures of political, social or cultural relevance.

Similarly, there are a number of checklist-style frameworks that provide lists of activities undertaken by organisations or teachers engaging in e-learning. An example of this is the US Sloan Consortium Quality Scorecard for the Administration of Online Education Programs (http://sloanconsortium.org/quality_scoreboard_online_program). The 70 statements in this scorecard are assessed on a four-point scale and a summary score generated. While the statements in this type of framework may be grouped in some manner they typically do not differentiate between those that relate to specific operational tasks and those that encompass much broader aspects of organisational activities. The scale of the individual items can also become ambiguous and hard for non-specialist users to make reliable judgements with. There are many examples of checklists in the literature, most lacking any formal validation or underlying theoretical framework informing the selection and prioritisation of items. One exception is the European E-xcellence+ system, which offers a rigorously developed self-assessment checklist used to introduce institutions into a process

of peer reviewed full assessment resulting in the awarding of an E-xcellence Associates label or quality mark (Ubachs, 2009).

A number of checklists describe themselves as being maturity models and attempt to frame generic criteria within the original CMM levels (for example, Neuhauser, 2004). In many cases this is simply used to provide a narrative around experience, rather than as a mechanism clearly driving the criteria selection and descriptions. The main advantage of many of the checklists is that they are freely available for anyone to review, critique and apply in their own context, unlike many of the other frameworks discussed in this section. The New Zealand E-Learning Guidelines is a form of checklist, or knowledge base, used to guide and inform practitioners but without an embedded quality model (Higgins, 2011). The eMM can be seen as a form of checklist, but it differentiates itself in terms of the scope, the design of the items that are designed to be equivalent in focus and scale within the frame of the dimensions, and the explicit theoretical model of organisational systems development and process improvement that has guided its ongoing development.

Most countries have some form of quality assurance and accreditation framework that is used to ensure higher education provision is of an appropriate standard. The US has a number of such frameworks established regionally by accrediting commissions (so many, in fact, that fraud and misrepresentation have become an issue, http://www.chea.org/pdf/CHEA_USDE_AllAccred.pdf). The United Kingdom has had a number of different approaches over the past decades and is currently engaged in a major reform of quality assurance systems as that country confronts the consequences of dramatic changes in funding (Brown, 2011). Other countries have government agencies such as the Australian TEQSA and New Zealand NZQA. There are also accrediting frameworks operated by disciplinary consortia such as the European Foundation for Management Development teChnology-Enhanced Learning (EFMD CEL) accreditation system for e-learning programmes (<http://www.efmd.org/index.php/accreditation-main/cel>). This involves a full audit process and a challenging process of improvement (Meier *et al.*, 2011). In general, however, quality assurance frameworks do not focus on e-learning and the use of technology specifically, but rather apply general principles to all forms of teaching. The main defining characteristic of these frameworks is the comparison of the organisation against a set of minimum expectations or standards. Normally, the focus is on what is being done, not on the process of generating that outcome or the ways in which that can be further improved or developed.

A natural complement to formal quality assurance frameworks are the performance indicators used in countries such as New Zealand (TEC, 2011), Australia (DEEWR, 2011) and the United Kingdom (HEFCE, 2007) by funding agencies in order to ensure that the performance of institutions is in line with the expectations of the government's funding policies. These indicators provide an extremely abstracted summary of performance and, consequently, little information on how to improve processes or outcomes, although they are certainly influential when setting strategic and operational priorities.

In addition to government performance indicators there are the sets that are used to generate league tables or rankings of international universities aimed at potential students or donors. These have been subject to many methodological criticisms as they essentially reflect opinion or reputation rather than any empirical evidence of the outcomes possible for students (Bowden, 2000; Harvey, 2008).

Despite the political support for their use, the performance indicators reported in education are generally seen by researchers as unreliable or unhelpful (Barnetson and Cutright, 2000;

Gibbs, 2010; Harvey and Williams, 2010). The absence of standard curricula for higher education subjects means that measures of student outcomes have to be treated with caution. There is currently no way to assure or audit the generally held presumption that degrees in the same major obtained from different New Zealand institutions are in fact functionally and qualitatively equivalent, an assumption inherent in the current performance indicators. Performance indicators designed for traditional modes of delivery such as retention are also regarded as very unreliable for flexibly delivered programmes where student cohorts inevitably fragment (Lee and Buckthorpe, 2008). Ultimately it is questionable whether retention can be actually influenced substantively by institutions (Zepke and Leach, 2007).

Falling between checklists and formal quality assurance and accountability frameworks are benchmarking systems. Benchmarking most simply is a (usually collaborative) process where an organisation examines an area of work in detail, comparing their own processes with those of organisations identified as being leaders in the performance of that activity (Camp, 1989; 1995). Traditionally this is focused around a single area of work (for example, human resources) and the comparisons are often done with organisations from completely different industries. Benchmarking in higher education is generally framed more tightly than this, with comparisons done only with other educational institutions and often with a set of existing exemplars used to guide the benchmarking work.

Over the last couple of decades there have been a number of benchmarking systems developed for higher education and for the use of technology (Bacsich, 2005b; Nazarko *et al.*, 2009). European agencies and institutions have been particularly active with a number of different schemes funded and engaged with over the past decade (Nazarko *et al.*, 2009; Ossiannilsson and Landgren, 2011). Many of these are either now out of date or operated commercially with strict confidentiality regarding the process and outcomes. Currently there appear to be three e-learning benchmarking systems with detailed criteria publicly available and being maintained. They are Pick&Mix (Bacsich, 2009), the ACODE benchmarks (<http://www.acode.edu.au/benchmarks.php>), and the eMM.

The ACODE benchmarks are framed very traditionally with specific criteria addressing eight areas that can be used to help institutions collaboratively benchmark and learn from each other. The Pick&Mix model shares a number of features with the eMM, and the authors of both systems actively collaborate. Unlike the eMM, Pick&Mix is designed so that institutions can choose which aspects of their work they focus on. Each selected criterion is then rated on a six-point maturity scale. The eMM differs substantially from these other benchmarking models in its comprehensive coverage of institutional activities and the requirement that no assumptions be made about priorities prior to the assessment. The eMM also uses the dimension concept to ensure that processes are fully engaged with at an organisational level, not simply undertaken.

Finally, there is the issue of validation (Inglis, 2008). Both the eMM and the Pick&Mix models have been subjected to a range of validation activities including scrutiny by independent experts, application and testing in both pilot and large-scale settings, and through detailed case studies (Bacsich, 2008; Marshall, 2006a; Neal and Marshall, 2008) including the work reported here. The eMM has also been subjected to limited empirical evidence gathering in support of the assessment reliability and robustness (Neal and Marshall, 2008; Beames *et al.*, 2009).

In summary, the eMM sits between the informal approach of checklist quality assessments and the structured quality assurance models used by government agencies. As a benchmarking framework it guides and supports institutions collaborating or working individually on their e-learning capability. The eMM also adds a means of actively engaging with the organisational systems that generate the capability – supporting leaders and managers in not merely improving performance measures or specific activities but instead taking a systems approach to improving the entire system.

Project Methodology

This project is conceived as action research (Lewin, 1944), looking for evidence of the impact a particular intervention (the eMM) can have on an organisation's behaviours over a two-year period. Clearly, while the focus is on the organisation, the behaviours analysed are those of key or representative human 'actors' within the organisation. This need to operate at several levels means that a set of related research activities were needed.

Each institution undertook eMM capability assessments that required the participation of a number of staff and the gathering of a corpus of relevant evidence. In addition, a series of structured interviews were undertaken with key staff during the project in order to gain insights as to the organisational culture and to look for evidence of change processes initially, and in response to the eMM assessments. A face-to-face workshop was also held at each institution following the initial assessment in order to stimulate a response consistent with the eMM's model of organisational improvement.

Clearly one outcome of this approach is that the eMM activities, including the evidence gathering, the questions asked in interviews, and the various analysis reports, are themselves influencing the behaviour of staff in the institutions. This is not inconsistent with the intention of the work or the eMM, as the assessments are based on activities already in place, not the intentions of staff to put them in place. In fact, the response of staff to specific questions helps generate the change activities proposed and informs their priority.

Sample Selection

One of the requirements of the project was that it should examine the impact of e-learning in the multiple types of New Zealand tertiary institution: a university, a PTE, a wānanga, and an ITP. The objective was not to produce a definitive statement regarding the capabilities of all institutions of those types, so the institutions were selected based on their willingness to participate and their representativeness as typical examples by size, resources and positioning in their respective sectors. None was exemplary according to the TEC performance indicators, but nor were any underperforming.

At the start of the project, four universities indicated willingness to participate but three were forced to withdraw at an early stage because of issues resulting from restructuring activities unrelated to e-learning.

This resulting sample of four institutions cannot be considered a random sample, but unless the project had been dramatically enlarged beyond all practical possibility, it could never have been able to generate data able to be quantitatively validated. As an action research project, the results must be interpreted in qualitative terms, as evidence that the methods used do work in particular ways in at least some situations. Larger studies (for example, Sero, 2007; Marshall, 2006a; Neal and Marshall, 2008) have undertaken censuses of sectors using the eMM to validate the assessment activity. The goal here was to identify factors that influence the response to those assessments in specific situations. Once identified, these factors can then potentially be examined over a larger sample in order to validate their general applicability. The current study results are potentially biased in that the institutions had to be disposed towards change in order to participate and so should not be considered representative of what might occur when change is being strongly resisted.

eMM Capability Assessments

The project commenced with an eMM assessment of each participating institution. The eMM capability assessments were done with the eMM version 2.3 practices and processes outlined in Marshall (2006b), as outlined earlier.

Institutional contacts provided initial evidence based on a checklist and questionnaire. The eMM tool aims to use an evidence-based approach in order to:

- remove individual opinion as much as possible
- have data to illustrate the basis of the analysis
- demonstrate actual, rather than intended or idealised practice
- demonstrate alternative practices within an institution.

Examples of evidence are: materials from enrolment packs, websites, course material, policies and procedures, people describing what they do when performing particular tasks or making decisions, minutes of meetings, plans, service level agreements, templates, evaluations, budgets, strategic plans, business cases and so on.

The eMM also references a number of courses (three or more as needed) as evidence of the operational activities undertaken as part of e-learning. These courses were not selected as exemplars of best practice, but rather as examples of normal practice within the institution. Institutional contacts assisted in the selection of appropriately representative courses.

This body of evidence was analysed for capability using the eMM and a preliminary or draft assessment prepared. This was discussed with the institutional contact and used to identify additional evidence of capability to refine the assessment. This draft was then further developed into a draft assessment report containing details of the assessed capability for every practice and process as well as advice on the implications for the institution and how the process might be improved (Figure 9). This process summary was also supported by the assessments for each practice comprising the dimensions of that process (e.g. Figure 5).

The draft assessment was used to inform the interview process (see below) and a final check of the analysis was undertaken with the interviewees in order to identify missed evidence or misinterpreted activities (but importantly no form of negotiation of the actual assessment rating is done). The final report was then provided to the institution as used to frame a change workshop conducted on site (see below).

eMM Change Workshops

The eMM assessment report was presented to a mix of teaching, support and management staff at a workshop held at the institution. This workshop was used to socialise the results of the assessment in order to stimulate critical engagement and to identify how the institution might respond. The presence of a wide variety of staff is essential to ensuring that the response is holistic rather than fragmented. The assessment report includes a number of recommendations prioritised by the assessor and these were discussed at the workshop. This provided an opportunity for the staff to identify additional priority responses.

Once the important activities needing action had been identified, the workshop generated an initial set of change projects to address these and assigned responsibility for these projects to specific individuals.

L1: Learning objectives guide the design and implementation of courses															
	2010				2011										
	Delivery	Planning	Definition	Management	Optimisation	Delivery	Planning	Definition	Management	Optimisation	Delivery	Planning	Definition	Management	Optimisation
University NZ-A															
University NZ-B															
University NZ-C															
University NZ-D															
University NZ-E															
University NZ-F															
University NZ-G															
University UK-A															
University UK-B															
University USA-A															
University Aus-A															
University Aus-B															

Figure L1-1: Summary of process capability across the assessed institutions

University NZ-C Capability

In common with most modern institutions, University NZ-C courses list statements of the learning outcomes students should experience on completion of the course. However, also in common with many other institutions this information is not consistently and explicitly linked throughout other course materials such as assessments and other activities, in a way that clearly conveys to students why they are being asked to undertake these activities. Some of the courses provided excellent overviews of the linkage while others had no information whatsoever.

The need for better quality learning objectives is being recognised by the Academic Committee and [Academic Development Centre] have prepared resources for the improvement of learning objectives. This resource is aimed at encouraging staff to see the creation of learning objectives as supporting a pedagogical process aligned with the needs of the overall programme. These resources are still being discussed at committee level but are being piloted with a limited number of courses. An alignment of learning objectives with the University NZ-C graduate attributes has commenced in some programmes.

Stronger capability would be easily achieved if learning outcome statements were consistently linked throughout course activities as is done in some courses already, and if teaching staff were provided with a much more comprehensive set of resources for creating and using learning outcome statements in their courses.

Figure 9: Example of a process assessment statement

Interviews

Interviews with staff in a range of roles were also conducted using the interview framework provided in Appendix A. The objective of these interviews was to test the information obtained in the eMM assessment analysis, but also to gather information on staff perception of change within the institution. The questions examine the process of change, the leadership of change and the likelihood of future change. Interviewees were asked to place their responses within the context of previous or current technological change projects. Role-specific questions were developed by extracting role-specific practices from the eMM and editing these into a coherent set. The alignment with the eMM processes and dimensions is indicated along with the questions in Appendix A. The questions were tested with institutional contacts first and revised based on their feedback to improve clarity and reduce unnecessary repetition.

Interviews were conducted in private offices with only the participant and the interviewer. Informed consent was obtained and the interview subject invited to answer the questions. Interviews were recorded with the consent of the subject and transcribed for review and confirmation for accuracy. Consent to use the text in publication was reconfirmed after

transcription. Sufficient interviews were conducted in each institution of staff in teaching, support and management roles that quotes could be used without risk of identifying individuals.

At the conclusion of the project an additional set of interviews were held with staff to inform the final assessments and to gather evidence of how the change projects had been undertaken and how they had influenced the institution.

Case Studies

Each of the four participating institutions received a detailed 150-page eMM assessment report similar to that illustrated here:

http://www.cad.vuw.ac.nz/research/emm/documents/example/20071115_2.3_Detail_Report_USP_Core.pdf. Combined with the outcomes of the change workshops, change projects and interviews, this formed the corpus of information that was synthesised into a coherent case study. Each case was written to a common framework outlining the specific context of the institution, the assessments of capability, the organisational change responses and outcomes, and the lessons relevant to other institutions and the sector as a whole. Case studies were provided to each institution to confirm their permission to publish.

Human Ethics

Full human ethics approval to conduct this research was obtained from the Victoria University of Wellington Human Ethics Committee (Approval #17271/2010 and #73/2004). All participants were provided with detailed information and consent forms that included strong guarantees of confidentiality for themselves and their institution. All transcription was done by staff subject to a confidentiality agreement and transcripts were provided to the subject for confirmation of the accuracy and completeness of the statements as well as permission to use as quotes. Institutions were provided with copies of their case study and the project report to confirm consent to publish.

Project Outcomes

A total of seven eMM assessments were conducted of the four institutions over the period of the project. Summaries of these assessments are shown in Figure 10. Changes in institutional capability assessed over the 18 months are shown in the figure as red (decreases) and green (increases) boxes.

Case Study Details

The institutional cases are described in much more detail in four separate case study documents. The summaries below provide a brief overview of each case as the key lessons from each institution's experience. Interested readers are encouraged to read the full case documents to gain a complete understanding of the case and the change processes that have occurred.

ITP-Z Case Study

ITP-Z is a mid-sized ITP based in an urban setting. A successful institution, both financially and for its students, ITP-Z has had a clear intention that technology play a significant role in its learning and teaching activities. The institutional strategy has stated a clear goal that the institution use technology to drive new opportunities for students and for the institution in the future. While technology is seen as important, the institution recognises the importance of face-to-face contact for its student body, subjects and level of qualifications and is intending that technology support face-to-face teaching rather than fully online teaching. ITP-Z has been using the eMM for six years to benchmark its e-learning capability, to identify potential areas for improvement and to assess progress towards the achievement of its strategic objectives for technology use (Figure 11).

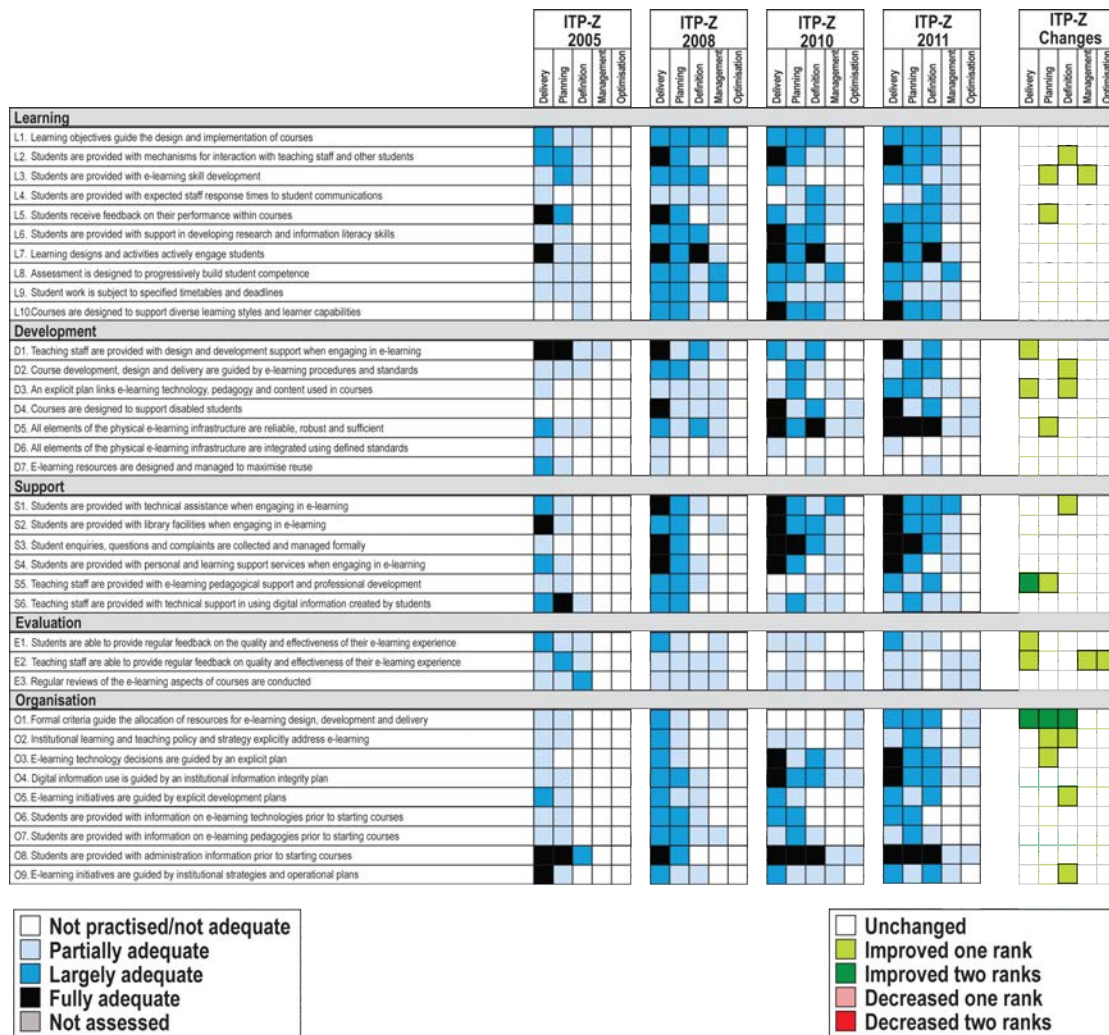


Figure 11: ITP-Z eMM Assessments, changed capability from 2010 to 2011 marked in green on last carpet

The assessments in Figure 11 show an overall strengthening of the capability over period 2005-2010, although with some aspects that have weakened between 2008 and 2010. A reduction in capability can occur for a number of reasons. Firstly, e-learning is a fast-moving field and activities that would be *Fully Adequate* in earlier assessments may no longer be so. The 2008 assessment used only the core eMM practices while the current assessment uses

the full set, and this can lead to slight changes in the process summary assessment for each dimension due to rounding differences. Finally, and likely to be the cause here, ITP-Z made significant changes in how e-learning is supported during 2008 and 2009 as part of a commercialisation focus and this appears to have disrupted existing support mechanisms.

The major issue identified in the 2010 assessment was the absence of a structured set of operational activities aimed at realising the strategic goal of the institution for technology use. This lack was identified in planning documents, including the need for greater development of staff skills and the use of technology to change the experience of students, but had not been reflected in actual activities at that time.

I think they've ticked the e-learning box and then moved on – onto something else. [ITP-Z Staff Member, 2010]

Two projects were identified from the eMM assessment at the workshop held at the end of 2010, respecting the need for change projects to be achievable in the context of the institution at that time:

- Development of professional development qualification for staff focused on e-learning
- Development of Library resources for students supporting digital literacy.

In addition to the eMM assessment, ITP-Z undertook a strategic review of their teaching led by an external consultant with a strong relationship to the institution. These two reviews, combined with a survey of staff confidence in the use of existing technologies, led to the realisation by senior managers that existing operational actions were not generating the outcomes envisioned in the strategic plan. In response, two more projects were initiated to develop ITP-Z-specific models of e-learning and to help staff develop their capabilities with the range of technologies available.

The combination of an explicit acknowledgement of their needs, combined with a genuine opportunity to generate new ideas for how they might teach, has resulted in a very positive improvement in the institutional culture. The managers responsible for much of the activity over the last year have set goals and provided resources, including new staff, but then they stepped back and let much of the detail be determined by the teaching staff. Decisions about priorities for courses, teaching models and changes have been made primarily by the staff directly involved. It is important to emphasise that this has not been an 'early adopter' model of innovation (Rogers, 2003). The systems put in place are aimed at involving all the staff. A 'technology festival' was held with attendance mandatory for all staff – not a special event for a small number of early adopters. The models and frameworks for development and pedagogical change are intended for use by all staff, and substantial resources for professional assistance are available to ensure that courses are redeveloped because of their priority to the organisation, not solely because of the passion or skill of an individual teacher.

This case illustrates the length of time and resilience needed for an institution to make substantial changes in learning and teaching. It provides an example of how an institution's leaders can recover from unsuccessful strategies, engage with and re-energise their staff, and generate a new sense of collegial involvement in the future of the institution. Key change strategies include: clear and consistent strategic goals over an extended period; using critical reflections on the capability of the institution to stimulate changes in

operational actions supporting that strategy; involvement of staff in the generation of new models of education relevant to the particular situation of the institution; and respect for and recognition of the need for staff to be supported actively and systematically in the development of new skills.

PTE-A Case Study

PTE-A provides vocational training to approximately 1500 students engaged in full- and part-time study. The students are predominantly mature and are based throughout New Zealand, usually in either part-time or full-time employment in the industry. PTE-A has been in operation for more than 25 years, initially as a face-to-face provider, but in the last decade offering distance options as well. Distance delivery was originally undertaken using paper materials in a traditional correspondence model; however, an online option was introduced in 2009 and now constitutes the predominant mode of delivery. Over the last three years e-learning has gone from being one of three modes of delivery undertaken by PTE-A to the primary form used. Only very small numbers of students are still being taught by correspondence or face to face.

The capability assessment for PTE-A in 2010 (shown in Figure 12) demonstrated that the institution was already very capable in its engagement with e-learning. The assessed capability is stronger than that assessed for any other New Zealand institution at that time, comparable to the largest international tertiary providers. Notably, PTE-A had strong capability in the *Optimisation* dimension, reflecting an ability to drive systemic change that is not evident in many institutions.

The eMM assessment results and analysis were shared with a group of PTE-A staff and managers at a workshop, and a process of issue prioritisation and project planning was facilitated. Four projects were identified as a result of that workshop:

- A formal risk analysis and examination of the technology infrastructure
- Collection of feedback information from staff and students on their experience using technology
- A re-examination of the pedagogical model being used in courses, triangulating the learning objectives, learning activities and assessment
- A re-examination of the ways in which technology is integrated into online courses and an expansion of the types of technology being used.

Two events helped give the initial eMM assessment additional relevance. The first was the introduction of requirements that students demonstrate 'ICT mastery' in order to get registered for their profession; the second was the Christchurch earthquakes of December 2010 and February 2011. The earthquakes demonstrated the practical benefits of having a well-designed set of IT systems supporting learning and teaching. Systems were already sited and managed in a way that meant that physical disruption to the servers was a minor issue and no data was lost.

The updated assessment undertaken in late 2011 is shown in Figure 12 with changed assessments marked by a red border. The pattern of change shows that PTE-A operates very much as a managed organisation with change first happening predominantly in the *Organisation* processes. What is not yet evident in the assessments are the downstream activities resulting from the work of the last year on the projects, all of which are expected to have a significant impact on capability in other areas, particularly the *Learning* processes.

	PTE-A 2010				PTE-A 2011				PTE-A Changes						
	Delivery	Planning	Definition	Management	Optimisation	Delivery	Planning	Definition	Management	Optimisation	Delivery	Planning	Definition	Management	Optimisation
Learning															
L1. Learning objectives guide the design and implementation of courses	■	■	■	■	■	■	■	■	■	■					
L2. Students are provided with mechanisms for interaction with teaching staff and other students	■	■	■	■	■	■	■	■	■	■					
L3. Students are provided with e-learning skill development	■	■	■	■	■	■	■	■	■	■					
L4. Students are provided with expected staff response times to student communications	■	■	■	■	■	■	■	■	■	■	■				
L5. Students receive feedback on their performance within courses	■	■	■	■	■	■	■	■	■	■					
L6. Students are provided with support in developing research and information literacy skills	■	■	■	■	■	■	■	■	■	■					
L7. Learning designs and activities actively engage students	■	■	■	■	■	■	■	■	■	■					
L8. Assessment is designed to progressively build student competence	■	■	■	■	■	■	■	■	■	■					
L9. Student work is subject to specified timetables and deadlines	■	■	■	■	■	■	■	■	■	■					
L10. Courses are designed to support diverse learning styles and learner capabilities	■	■	■	■	■	■	■	■	■	■					
Development															
D1. Teaching staff are provided with design and development support when engaging in e-learning	■	■	■	■	■	■	■	■	■	■					
D2. Course development, design and delivery are guided by e-learning procedures and standards	■	■	■	■	■	■	■	■	■	■					
D3. An explicit plan links e-learning technology, pedagogy and content used in courses	■	■	■	■	■	■	■	■	■	■	■				
D4. Courses are designed to support disabled students	■	■	■	■	■	■	■	■	■	■	■				
D5. All elements of the physical e-learning infrastructure are reliable, robust and sufficient	■	■	■	■	■	■	■	■	■	■	■	■			
D6. All elements of the physical e-learning infrastructure are integrated using defined standards	■	■	■	■	■	■	■	■	■	■					
D7. E-learning resources are designed and managed to maximise reuse	■	■	■	■	■	■	■	■	■	■					
Support															
S1. Students are provided with technical assistance when engaging in e-learning	■	■	■	■	■	■	■	■	■	■					
S2. Students are provided with library facilities when engaging in e-learning	■	■	■	■	■	■	■	■	■	■					
S3. Student enquiries, questions and complaints are collected and managed formally	■	■	■	■	■	■	■	■	■	■					
S4. Students are provided with personal and learning support services when engaging in e-learning	■	■	■	■	■	■	■	■	■	■					
S5. Teaching staff are provided with e-learning pedagogical support and professional development	■	■	■	■	■	■	■	■	■	■					
S6. Teaching staff are provided with technical support in using digital information created by students	■	■	■	■	■	■	■	■	■	■	■				■
Evaluation															
E1. Students are able to provide regular feedback on the quality and effectiveness of their e-learning experience	■	■	■	■	■	■	■	■	■	■	■				
E2. Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience	■	■	■	■	■	■	■	■	■	■	■	■			
E3. Regular reviews of the e-learning aspects of courses are conducted	■	■	■	■	■	■	■	■	■	■	■	■	■		■
Organisation															
O1. Formal criteria guide the allocation of resources for e-learning design, development and delivery	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O2. Institutional learning and teaching policy and strategy explicitly address e-learning	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O3. E-learning technology decisions are guided by an explicit plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O4. Digital information use is guided by an institutional information integrity plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O5. E-learning initiatives are guided by explicit development plans	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O6. Students are provided with information on e-learning technologies prior to starting courses	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O7. Students are provided with information on e-learning pedagogies prior to starting courses	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O8. Students are provided with administration information prior to starting courses	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
O9. E-learning initiatives are guided by institutional strategies and operational plans	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

□ Not practised/not adequate

■ Partially adequate

■ Largely adequate

■ Fully adequate

■ Not assessed

□ Unchanged

■ Improved one rank

■ Improved two ranks

■ Decreased one rank

■ Decreased two ranks

Figure 12: PTE-A eMM Assessments for 2010 and 2011, changed capability marked in green

Factors that have helped PTE-A succeed in its use of technology include:

- Strong leadership, willing to engage with staff at all levels of the organisation and harness their ideas while still providing a clear sense of direction and strategic intent
- Statements of the business outcomes enabled by the technology, framed in terms of goals that are easily understood by all staff and able to be measured as they are achieved
- A clear sense of who the students are that the institution is teaching
- External requirements that students demonstrate ICT mastery
- Timely examples of the relevance and impact of the technology for the organisation, notably the Christchurch earthquakes
- The ability to make structural changes, recognise the need for new skills, and be able to attract and retain staff with skills and experience not already present within the institution.

Successful models of online learning can easily dominate the operations of an institution within very short timeframes if the systems and processes are able to respond to student preferences. PTE-A has gone from online learning being a minor part of their operation to constituting over 90 percent of their business in less than three years with much of that growth occurring in the last 12 months. The work of Kurzweil (2005) and others warns that technological change is not subject to merely exponential rates of evolution, but double exponential growth – when the various success factors align, organisations have very little time to seize the opportunity.

I think that's one of the strengths of [PTE-A]. We see something that is effective, that can support student learning, and we don't hold back on it. We look at all the possibilities: can we do it next week? Can we do it next month? And we go for it. [PTE-A Academic]

Wānanga A Case Study

Wānanga A, established for approximately 30 years, is an education institution of a type unique to New Zealand. Wānanga undertake teaching and research based on āhuatanga Māori in accordance with tikanga Māori that is informed and embodied by mātauranga Māori. Consequently, education happens in a manner consistent with and enabled by Māori culture, language and protocols. Wānanga A offers qualifications at a range of levels throughout New Zealand, primarily by face-to-face instruction. Over the last four years the wānanga has made a significant investment in information and communication technologies, including the creation of an online learning environment to support student learning. This investment is seen as necessary for the development of staff and student skills and capability as well as supporting teaching and learning throughout New Zealand, while still respecting the wānanga philosophy.

The capability assessment for Wānanga A is shown in Figure 13 with assessments of other New Zealand providers of comparable size shown for context. Wānanga A's weak assessment reflects the reality that they have only relatively recently committed to the use of technology through the establishment of their learning management system (LMS) and associated support unit.

Looking at the assessment of Wānanga A in Figure 13, clear strengths are apparent in the *Delivery* dimension of the *Learning* processes as well as in the student support processes, reflecting the wānanga philosophy's strong focus on the student and the direct experience of learning. The institution provides excellent support services for students, built around a model of strong pastoral care integral to the wānanga philosophy. Support for e-learning is provided face to face by tutors and [e-learning support unit] staff during sessions at the start of courses and as required by students. Clearly, the teaching emphasis remains on the face-to-face activities. Consequently, the capability seen is predominantly a consequence of overlap between traditional modes of delivery and e-learning, rather than a clearly changed pedagogy taking advantage of the [e-learning support unit] facilities and support.

An issue identified early in the assessment process was that, despite the intention for all staff to be enabled and able to drive the use of technology, there was still a heavy dependence on a single middle manager's leadership. The E-Learning Director was responsible for developing the substance of the e-learning strategies and vision, and was clearly trusted by the senior managers to lead the wānanga's thinking and planning in the e-learning space.

[The E-Learning Director] does lead that but there is a difference between leadership versus accountability. He can lead it but how many of these guys are going to take ownership and can be accountable for delivering or pursuing their roles that they own. It's that ownership component. [Manager]

The wisdom of this statement was rather harshly illustrated by the death of the E-Learning Director in the middle of this project. It became rapidly apparent that he drove much of the activity in the e-learning space at the wānanga and performed a number of roles that were not widely or explicitly recognised. He provided both a strategic and an operational vision for the technology to both the wānanga leadership and also the teaching and support staff. He modelled the ways in which the technology could be used through his own teaching and support activities, and he performed a number of key operational tasks (such as making backups). Responding to this tragic loss has taken the wānanga most of the last year and has seen his single role being undertaken by a number of different people, who now recognise that more structured mechanisms are necessary.

The most significant change project was undertaken by the wānanga during the period of the eMM assessment in response to the death of the E-Learning Director. Staff in the [e-learning support unit] and in the IT group rapidly took responsibility for a range of operational tasks to ensure the continuity of the learning and teaching done by the wānanga using technology. Meetings and a workshop were held with these staff to review the eMM assessment and to identify priorities for the next one to two years. Four projects were identified and assigned to particular staff to own and facilitate:

- The adoption of a more formal approach to the management of the [e-learning support unit] infrastructure owned by the IT group and administered according to their standard procedures
- The updating of teaching and learning policies, processes and support resources to acknowledge and address systematically the way that technology changes the nature of learning and teaching within the wānanga philosophy
- The communication to students of information on the key technologies they need to be able to use when studying at the wānanga, how the technologies enhance their learning, and where they can get support to maximise the benefits
- A re-engagement with the strategies and plans the wānanga has for technology to ensure that leadership engagement is sustained and clear organisational objectives aligned with the technology plans.

These projects represent a significant re-focusing of the wānanga and a change in the organisational structures that will see a more robust and resilient engagement with e-learning in the future.

This case illustrates the significant risks all institutions face when they depend on a single person to lead and enable the use of technology. It provides an example relevant to the situation of many small institutions, which depend on a single innovative leader during the early phases of a shift to e-learning, and are consequently unaware of the range of roles that person undertakes and the organisational activities they perform invisibly. The key lesson of this case is the need to plan early for the implications of success and ensure that resilience, robustness and redundancy apply equally to staff as they do to technology infrastructures.

University NZ-C Case Study

University NZ-C is a medium-sized New Zealand university with a traditional focus on face-to-face education and an emphasis on research and postgraduate education. A well-established institution, the university is financially secure but faces significant challenges resulting from the current Government's decision to change the funding model from one of growth to one where numbers are capped and entry is based on academic success (TEC, 2009). As with all New Zealand universities, research performance is measured externally by the Performance Based Research Fund (PBRF), while educational performance is measured by a set of performance indicators focused on student retention in study, course completion and qualification achievement. The PBRF ranking and contingent funding depends substantially on individual staff productivity, which is sampled in six-yearly periods with the current period completing at the end of 2011 (TEC, 2012).

The capability assessment for University NZ-C in 2010 is shown in Figure 14, where it is compared to that of a number of international universities. The assessment is consistent with that seen in other New Zealand universities (Marshall, 2010a) and is, in general, weaker than that seen in the international universities. Capability is concentrated primarily in the *Delivery* dimension, with some strength in the areas relating to student support and the technical infrastructure. This pattern is similar to that seen in a number of institutions that have treated e-learning purely as a technological challenge.

The following areas were identified as priorities for action by University NZ-C:

- The way that technology changes the nature of learning and teaching needs to be explicitly acknowledged and addressed in a systematic way in University NZ-C's teaching and learning strategies
- Improvement of the course outlines and supporting documentation to include detailed information on course assessment and other learning activities aligned explicitly with the learning objectives and the technologies being used to support student learning
- An increased emphasis needs to be placed on professional development in course design for all teaching staff, with support and resources developed to encourage innovation and effective use of new technologies
- The relationship between feedback, assessment and student learning should be made more explicit in course designs and in university policy, with an emphasis on responsiveness and structured relationships within the pedagogical model of courses.

Figure 14 shows the updated capability assessment for University NZ-C for 2011 next to that of 2010. Clearly very little has changed. During the last year University NZ-C established a working party to examine what role technology played and could play in the operations of the university. The working party included participants from across the university and was tasked with developing a strategic plan for technology use that would support the main university strategic plans. This group met over a six-month period and developed an extensive report for the university management that reviewed in detail the wider context for technology use by universities, how technology was currently being used within the university, and outlined a range of possible strategic options for the senior management.

The response to date at University NZ-C is very much within the mainstream for universities (Marshall 2010a). Many institutions have made an investment in a technological infrastructure without any substantive changes to the model of learning and teaching or the

experience of staff and students (Tierney and Hentschke, 2007; Bates and Sangrà, 2011; Marshall 2010a). The problem facing all universities is that the model of funding now in place in New Zealand means that the Government caps revenue and student numbers. Consequently, change must drive improvements in the quality and efficiency of operations, rather than support growth in access by larger numbers of students. The traditional model of adding costs that are balanced by increases in the scale of operation can no longer apply. Somehow the costs of new technologies have to be balanced by reduced costs elsewhere; something else must change.

This case illustrates the challenges facing many universities as they attempt to define how technology can improve the quality and efficiency of tertiary education while also responding to a rapidly changing social and economic context. The apparently slow pace of change in the university sector is well recognised (Kerr, 1987; Tierney and Hentschke, 2007; Duderstadt, 2009; Bates and Sangrà, 2011). It reflects the complexity and scale of their operations as well as the need for changes to be undertaken collegially and with an appreciation of the needs of diverse disciplines and stakeholders.

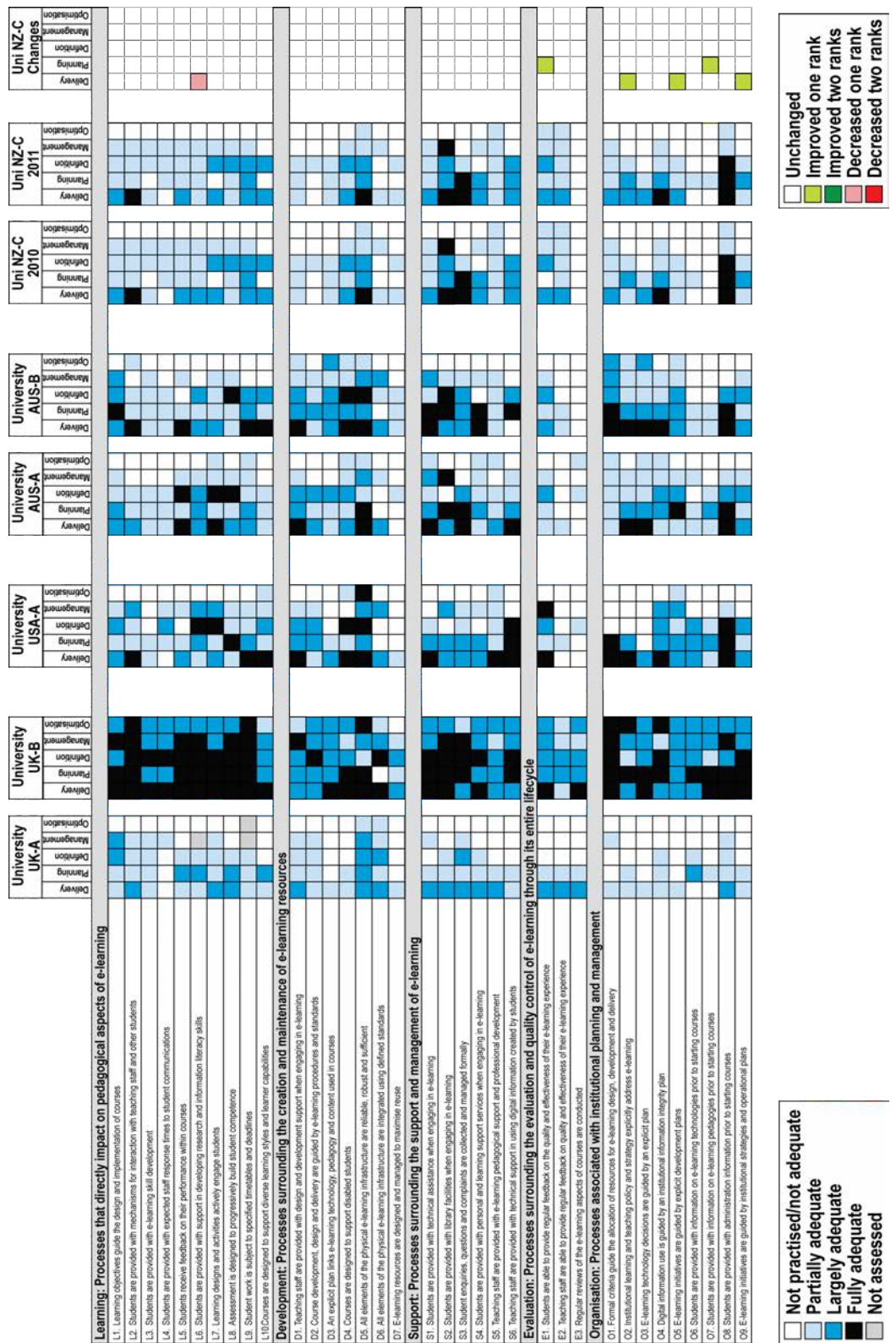


Figure 14: University NZ-C eMM Assessments for 2010 and 2011, compared with international universities

Analysis and Discussion

Changes in the Participating Institutions

All four of the institutions analysed have made substantial investments in technology and have the means to make substantial changes to the experience of their students and staff. Interestingly, they can be seen as falling on a continuum, with Wānanga A moving from an *ad hoc* and early-adopter-led approach to create an infrastructure for e-learning; University NZ-C having established a solid infrastructure but not yet defining goals for the effective use of it; ITP-Z, having tried one approach, has moved to empower its staff as part of changing its models for learning and teaching; while PTE-A is experiencing a dramatic change in its use of technology as its new model sweeps away the old.

Figure 15 shows the impact of the change projects and other activities over the last two years for the three institutions that completed the entire study. It is important to emphasise that these changes are independently assessed by the eMM and thus provide evidence of actual change, rather than the opinion of the staff involved. The final set of interviews was undertaken before the second assessment was provided to staff, and this meant that perceptions of change could be compared with the evidence seen with the eMM.

Looking at Figure 15, PTE-A has experienced more changes in capability, while University NZ-C has experienced the least. In all three cases the most change occurred in the *Organisation* process area; however, ITP-Z shows some indication of more widespread change than the other two. PTE-A is notable in having significant change in the *Optimisation* dimension, indicating their emphasis on continuous improvement.

ITP-Z's change projects were aimed at addressing a serious disengagement by staff and a sense that support for technology use had declined. Their change projects included a strong focus on staff development as well as greater clarity about the models of learning technology can enable. Additional resources were also made available for targeted improvement of courses in line with the new models. These initiatives are clearly having the intended impact when viewed through the eMM. Improved support of staff is evident in the changes to processes D1 ("Teaching staff are provided with design and development support when engaging in e-learning"), S5 ("Teaching staff are provided with e-learning pedagogical support and professional development") and E2 ("Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience"), while the impact of the new models is apparent in process D3 ("An explicit plan links e-learning technology, pedagogy and content used in courses"). Process O1 ("Formal criteria guide the allocation of resources for e-learning design, development and delivery") improvements reflect the changed approach to the resourcing of course projects. ITP-Z also shows a large proportion of changes in the *Definition* dimension, consistent with the greater clarity of purpose that has emerged from the change projects and the sense that there is now a plan for e-learning (as also seen by the changes in specific *Organisation* processes).

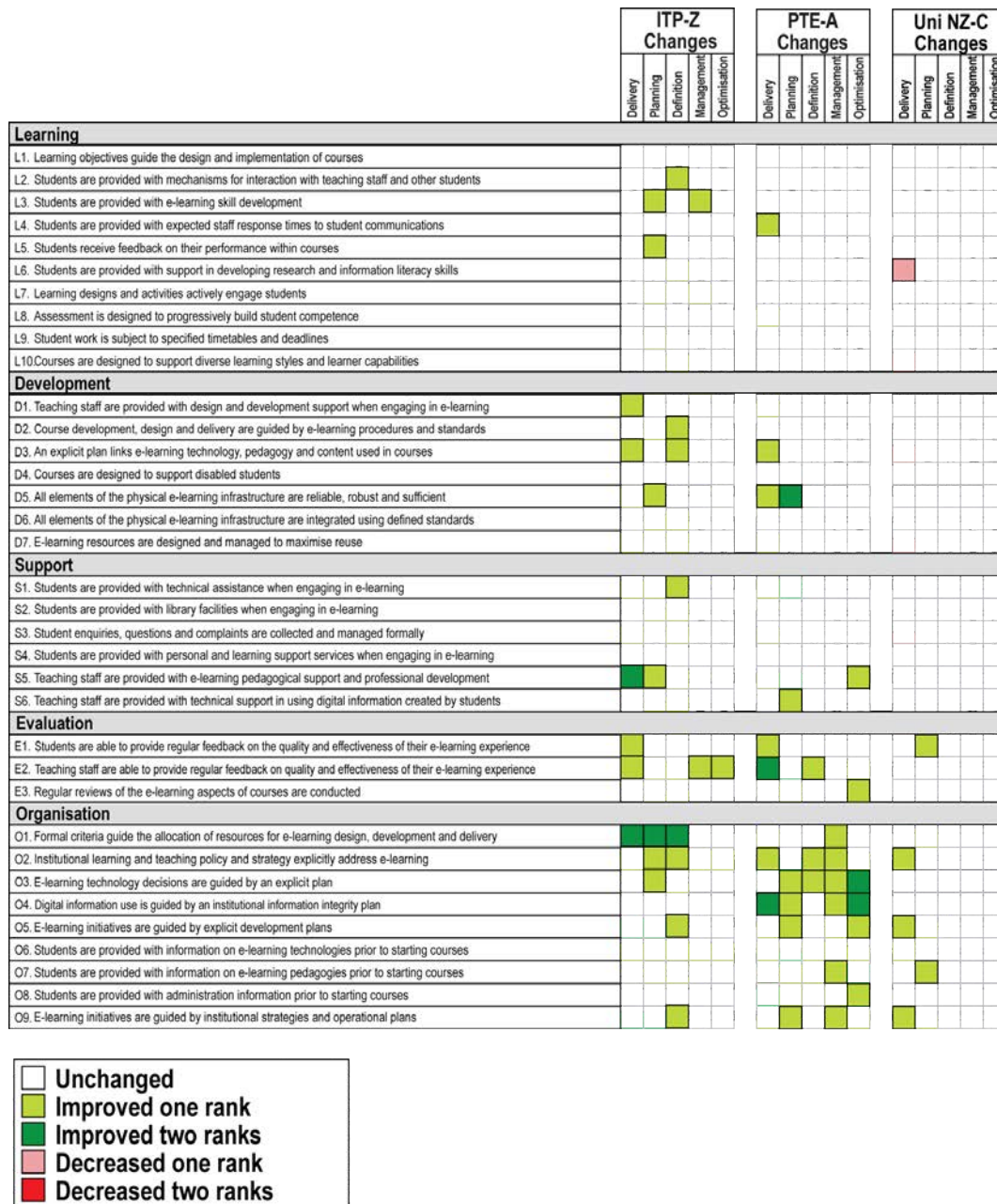


Figure 15: Changes in assessed eMM capability over the period 2010-2011

PTE-A was the most capable institution at the start of the project and has used the process to further develop that capability. The strong model of leadership perhaps explains the observation that the majority of the changes occurred in the *Organisation* process area and included a focus on the *Management* and *Optimisation* dimensions. PTE-A staff described a clear response to the original eMM assessment, which included immediate addressing of risks associated with their infrastructure (process D5 (“All elements of the physical e-learning infrastructure are reliable, robust and sufficient”)) and the focus on *Evaluation* activities in order to understand the impact new models of learning were having on students and staff. The deliberately planned and intentional nature of change at PTE-A is reflected in the strong capability they have in the *Management* and *Optimisation* dimensions already. This also has meant that the pace of change in some areas has been slower as time is taken

to understand what is really needed. This may explain why there is only minor change in the *Learning* and *Support* process areas.

The very slow pace of change at University NZ-C is starkly evident in Figure 15 with very few changes, including the only reversal seen in the current study. The need to gain consensus and wider commitment throughout the university to a strategic role for e-learning is apparent in the changes in capability in processes O2 (“Institutional learning and teaching policy and strategy explicitly address e-learning”), O5 (“E-learning initiatives are guided by explicit development plans”) and O9 (“E-learning initiatives are guided by institutional strategies and operational plans”). These reflect the initiation of strategic planning activities; however, the *largely adequate* assessment conveys the need for more work.

Rogers (2003, p436) describes the consequences of innovation as “the changes that occur [in] an individual or a social system as a result of the adoption or rejection of an innovation”. He notes that these are hard to predict and often not measured in studies that expect changes to always be positive, require longitudinal study, and can be hard to measure, particularly when there are confounding factors and events complicating the analysis. The data presented here are not subject to the first two limitations (with the caveat that longitudinal studies always reward longer engagement).

The final issue, of the extent to which the process of engagement with the eMM has influenced outcomes as opposed to other events, is harder to disentangle. Some of the changes, such as specific support activities in ITP-Z and the risk assessments and infrastructure changes in PTE-A, were direct consequences of issues identified in the initial eMM assessment. When interviewed, the staff of ITP-Z were also clear that the eMM assessment contributed to the realisation of the need to engage more actively with staff. The senior staff of PTE-A similarly recognised the value that the eMM assessment activities, including the workshop, had in influencing their staff’s attitudes to technology.

This analysis has been provided to the participating institutions and the expectation is that it will further inform an ongoing process of change, building on the momentum that (particularly in the case of PTE-A and ITP-Z) has developed. The reality is that only by continuing to observe the process of change over longer periods of time will the impact on all of the institutions become clear.

Factors Influencing Organisational Change

The four institutions can be seen as falling on a continuum, with Wānanga A moving from an *ad hoc* and early-adopter-led approach to create an infrastructure for e-learning; University NZ-C having established a solid infrastructure but not yet defining goals for the effective use of it; ITP-Z, having tried one approach, has moved to empower its staff as part of changing its models for learning and teaching; while PTE-A is experiencing a dramatic change in its use of technology as its new model sweeps away the old. Beyond these situational aspects, there are five key factors that arise from the analysis as important contributors to organisational change: time; leadership; strategic and operational outcomes; external coercion; and chance.

Time

Time for change to occur is an important factor. All of the institutions have invested in technology for a number of years, providing staff with systems that they are able to become familiar with, if not experts in their pedagogical application. ITP-Z has had the same strategic

objective for technology for the last six years while a series of operational plans and approaches have been tried. PTE-A has operated multiple models of delivery simultaneously for several years while developing a robust and complete model relevant to their students and disciplines. In both these cases there is evidence that this commitment has finally started generating a sustainable change to learning and teaching. In contrast, Wānanga A is still at a very early phase of exploration, while University NZ-C has paused in many respects.

The PTE-A case also illustrates the other extreme of time. The e-learning model and systems they have developed have gone from being one option of three modes supported 18 months ago, to being essentially the only mode of delivery now. The careful way that the management and staff of PTE-A have managed their systems, technological, pedagogical and organisational, has meant that they have been able to cope with that dramatic shift in mode without significant disruption. The lesson here is that institutions contemplating change of this type need to be aware that success as well as failure is risky. Leaders need to be sure they can manage the rapid pace of successful change.

Leadership

Leadership of different types is also evident in the cases as a significant factor influencing change. The experience of Wānanga A is a salutary reminder that while individual staff can take very influential leadership positions, organisations need to ensure that leadership is shared and a collective responsibility taken for significant changes. The smallest institution, PTE-A has benefited in part from that size, making direct leadership from the top a practical proposition. Few institutions are able to support the chief executive meeting one on one with staff to help them develop their skills. That clarity and directness of leadership has also been complemented by an awareness of the limitations it has, with organisational responsibility actively shared by the chief executive. PTE-A had a strong management team at the start of the project and an awareness of the need for shared responsibility for key activities, and this has been maintained through staff restructuring as the implications of change have become apparent.

The model of leadership in University NZ-C is strongly influenced by the collegial and devolved nature of a university management culture. Academic autonomy and freedoms, as well as the scale, diversity and complexity of the organisation, mean that any large-scale change is difficult to achieve and almost impossible to mandate. Instead, the university management has to consult and involve staff in the process of identifying the reasons, purposes and methods of change. Inevitably, this is slower, but balancing that are the substantial resources a university can invest once change is committed to.

ITP-Z has seen a strongly positive response from staff as a result of its shift to a collegial approach, with staff actively involved in creating new models and being actively supported with professional development. The shift from a centrally-driven, commercial model to one where the staff are able to be involved in the process of identifying and setting priorities for change has been very well received and has seen a re-engagement with the opportunities technology provides.

Strategic and Operational Outcomes

Interestingly, despite the change in method, ITP-Z has maintained clarity in its strategic goals for technology in learning and teaching over the six years studied. As well as a stable strategic plan, staff in management roles are able to articulate clear operational outcomes that the strategy is intended to achieve. PTE-A has also benefited from following a stable

strategic plan over the last few years, again with explicit operational benefits and support from the management team. Wānanga A has a clear strategy and a role that technology plays in supporting specific operational objectives, but has not yet seen that strategy realised. In particular, it is still cast in technological terms, describing goals for infrastructure and the use of specific technologies, but not yet in terms of the quality or nature of learning and teaching it will enable.

University NZ-C remains unclear in its strategic objectives for technology. Bates and Sangrà (2011) have observed that the intentions of universities for technology can often be described as cautious and limited to the classroom, and this certainly seems true here as well. New Zealand universities have also been strongly influenced by the systems of coercive isomorphism applied by the Government and agencies such as TEC with their focus predominantly on research. The PBRF, applied as an external requirement, has been very influential on the priorities affecting staff work and management. Only very recently has this been balanced, to a very limited extent, by the creation of performance indicators for learning and teaching.

External Coercion

The TEC performance indicators (TEC, 2011) may have had a positive influence on institutional management throughout the sector, but they also are measures of activity at a very high level of abstraction and fail to motivate any change in pedagogy, including the role played by technology. The government caps on student numbers (TEC, 2009), imposed essentially to minimise the public cost of tertiary education, are also acting as a negative incentive to the adoption of technology. One of the clearest benefits of e-learning is the ability to increase the scale of education, increasing access by more students including those with other commitments such as employment or families. However, the Government has prevented institutional growth. Institutions are now forced to consider how they can increase their internal efficiency in order to manage inevitable cost increases. Adoption of technology, which increases costs even for transitional periods, is increasingly hard to justify, particularly if it requires a degree of risk, as innovation inevitably does.

These caps have also affected PTE-A by changing the behaviour of students. The model of learning in that institution was genuinely flexible, with students able to enrol at any time and start courses with a group of students at various stages of completion. Students were encouraged to mentor their peers, and a very successful collaborative learning environment was operating. The cap on student numbers, however, led to access being restricted on a first-come, first-served basis. Unsurprisingly, students all enrolled at the beginning of the academic year and all flexibility of starting time was lost. As the students all started at the same time, the culture of mutual support and collaboration that had existed was lost, resulting in a different experience for both staff and students. PTE-A has also been affected by the changing models of quality assurance being operated by the government agencies, as the external reviewers and systems of the NZQA (New Zealand Qualifications Authority) are inexperienced in e-learning and even hostile to its use. In part, this follows from the inability of the current TEC performance indicators to accurately reflect teaching activities being undertaken in modes other than a rigid annual cycle of normally full-time study in classrooms aimed at specific qualifications.

Chance

The PTE-A and Wānanga A cases also illustrate the need to manage chance and the unexpected events that can influence organisations. PTE-A benefited unexpectedly from an

unanticipated change in the professional accreditation standards applied to practitioners in their field. This imposed a standard of technical literacy and competence on graduates that was very helpful in encouraging students to transition to e-learning from traditional distance and face-to-face pedagogies. PTE-A had also already been responding to the first assessment's recommendations regarding risk assessment and business continuity when the 2010 and 2011 Christchurch earthquakes illustrated the requirement for robust IT systems. A combination of good management and a little luck saw no disruption to their systems, and subsequently both staff and students based in Christchurch were able to continue courses even as the institution's facilities remained closed in the 'red zone'. Wānanga A had a far less positive experience with the death of the person who had been leading their use of technology. Many institutions using a strategy of incremental change from an initiative started by an early adopter are in exactly the same position and risk a similar disruption to their plans, if only as a result of staff leaving unexpectedly.

Impact on Learners and Implications for Learning and Teaching

Higher education quality improvement is always intended to have a positive impact on learners. It is, however, challenging to demonstrate evidence of that impact (Knight, 2002; Ewell, 2010; Coates and Seifert, 2011). In part, that challenge arises from the multitude of ways quality improvement activities influence organisations. The eMM examines activities that directly impact on student experience through to those that set strategic and operational priorities distantly connected to the experience of individual students.

This project has examined the impact of eMM assessments and consequent change on four different institutions. In the cases of PTE-A and ITP-Z, there are likely to have been significant impacts on the experience of their learners. ITP-Z students are experiencing changes in the support made available to them already, and are likely to see significant, and hopefully positive, changes in the pedagogical structure of their courses in the near future. PTE-A students have experienced a substantial change in the model of learning as they are moved to a predominantly online mode, and are likely to see that model further refined in response to their experience. Many PTE-A students have also had to maintain their studies through the disruption of the Christchurch earthquakes, and the changes in mode of delivery have made this possible.

Logic suggests that a more structured and planned approach to learning and teaching with a greater focus on the student experience will disproportionately benefit students who are currently underachieving. Technology does offer the possibility of supporting a more diverse range of learners, but it also raises challenges of cost and equity. The eMM is not a framework for assessing the quality of student learning or any other specific outcomes. The focus is on the capability of the organisation to achieve success in the activities it decides are important. There are a number of substantial benefits that technology can offer particular groups of New Zealand learners such as Māori and Pasifika students, students with special needs, and adult students who have struggled in the mainstream education system (Davis and Fletcher, 2010; Greenwood *et al.*, 2011). These outcomes need, however, to be explicitly identified by institutions in their strategic and operational priorities.

The current set of cases do not allow for any comment on whether the eMM would generate the sort of changes in organisation activities that would benefit specific groups of students. The wānanga case offers a possibility that, over time, evidence of impact in meeting the particular needs of Māori students through structured e-learning approaches aligned with the wānanga philosophy. For now it can only illustrate the negative consequences of a lack of systems and the promise for the future. A systemic response such

as that motivated by the eMM is likely to offer students more chance of success than the disjointed, if well-motivated, efforts of individual staff, but this has yet to be proven.

Beyond the specific impact on particular students, this project has identified a set of factors that influence an organisation's ability to change, to understand the changing needs of students and staff and to be responsive to those. In all four cases the eMM analysis has stimulated and supported a re-engagement with the nature and purposes of learning and teaching within each institution. By highlighting the lack of systems examining the experience of staff and students and the importance of a strategic approach to learning and teaching, the eMM has potentially enabled substantial long-term improvements in student outcomes.

Wider changes in New Zealand higher education seem inevitable as the Government continues to manage tight fiscal constraints. The eMM has provided the studied institutions with information that has positively supported changes to their approach to learning and teaching. It is reasonable to suggest that it can continue to have a positive impact in the future.

Future Work

The purpose of the eMM has always been to stimulate an improvement in the quality of learning and teaching supported by effective use of technology. Inevitably this improvement takes time, and while the eMM was expected to generate a positive response, it takes time to demonstrate whether and how this occurs. The current cases provide a good initial data set supporting the contention that the eMM is a useful tool for informing complex and large-scale organisational change.

Beyond this, one of the goals of this research was to examine the forms of change that have occurred within the institutions studied and the alignment of these changes with the model embodied in the eMM. PTE-A and ITP-Z have both responded to the eMM assessments with a systemic response and an operational response. Over the time of this study the latter has been able to generate specific outcomes, but there is also evidence that the systemic change activities are having a much broader impact on the institution and the experience of staff and students. Inevitably, more time is needed to see whether this continues, but the early signs are promising.

The ITP-Z case in particular demonstrates the value that successive capability assessments can have in understanding the impact of organisational strategies and initiatives. The intention is to maintain an ongoing relationship with all the participating institutions so as to generate more longitudinal evidence of change. The factors that have been identified in the current study also need to be tested in other contexts, along with those identified by Bates and Sangrà (2011) and Higgins and Prebble (2008). Work has already begun with a sample of 10 to 15 Australian universities with this objective in mind.

The eMM is an evolving model currently in its third major revision. A new revision is also intended, which will build on the current assessments as well as other work. Key changes are likely to include the removal of process O8 ("Students are provided with administration information prior to starting courses") and the substantial revision of process D7 ("E-learning resources are designed and managed to maximise reuse") as both appear to offer little value as currently formulated, despite having some support in the literature.

A final challenge, one shared with all of the different approaches to quality improvement including the Government's own performance indicators, is showing an impact of improved capability on student outcomes. Such an evidence base is unlikely to result from generic performance measures. One hope is that as more institutions become more self-aware – more mature in the eMM parlance – they will improve their *Management* capability and start generating evidence of the impact their activities are having on their students. Education ultimately is an individual experience and evidence of improvement is unlikely to be compelling until it rests on a detailed evidence base operating at least in part at the level of individual students.

Conclusions and Recommendations for the Sector

Technology is increasingly standardised and ubiquitous, but the ways in which it can change educational experiences are as varied as the needs of students and the types of institutions that support them. In each of the four cases analysed by this project the eMM has supported the staff of the institutions, not just the managers and leaders, as they analyse and reflect on the role and consequence of technology for their institution, their teaching and their students.

The impact of the changes in tertiary education New Zealand has experienced over the past two decades strongly argue for the need for a diverse sector with a range of institutions, qualifications and models for learning and teaching. Technology will inevitably be part of the means by which that diversity is supported and inevitably that will require institutions to change, and to manage that change thoughtfully and with evidence of its progress.

The analysis presented in this report suggests that leaders need to consider these factors when considering how their institution can change and respond to the opportunities offered by technology:

- **Time.** Both allowing sufficient time for experience and systems to develop to the point that they can support change but also in being able to sustain the rapid pace of change flowing from success
- **Leadership.** Maintaining the strength and clarity of leadership while also allowing for models of shared leadership and engagement consistent with collegiality and participatory innovation
- **Strategic and operational outcomes.** Identifying clear operational benefits from the use of technology and associated changes, and having a robust strategy able to support their achievement and the confidence to maintain that strategy despite external and internal challenges
- **External coercion.** Recognising and managing the threats and opportunities arising from the actions of external actors in the sector, in particular government agencies
- **Chance.** Being able to manage the random events that affect organisations with effective risk management strategies and an organisational agility able to respond in a timely and positive manner to unexpected situations.

Interestingly, while there are definitely overlaps with the factors identified by others, particularly with regard to strategy and leadership (Higgins and Prebble, 2008; Bates and Sangrà, 2011), time and chance seem here to have been more significant than is perhaps generally acknowledged. The other factors identified in the studies cited above are also reflected in the processes and practices of the eMM and, when needing improvement, are noted in the full institutional assessments as they certainly form the foundation for change.

Finally, while there is little evidence to support the panicky rhetoric of the late 1990s, there is still evidence that the complacent non-engagement of many institutions may be a problem in the future. The 2010 Sloan Survey of Online Education in the United States (Allen and Seaman, 2010) noted that in the United States online enrolment growth (21 percent) was significantly outpacing growth in the overall student population (< 2 percent for all forms of university enrolment). Almost 75 percent of public institution leaders described online education as critical to their institution's long-term strategy, although less than half of them had strategic plans addressing online courses – highlighting the delay between strategic realisation and strategic implementation. The survey also noted that virtually all

recent growth in online enrolments has come from existing offerings by established providers, not from institutions new to online delivery – suggesting the possibility of a widening gap between institutions that are engaging actively and those that are engaging minimally. This gap may ultimately become impossible to bridge, if institutions are unable to respond to the need for change. Fullan’s observation continues to express well the philosophy that underpins this work:

The answer to large-scale reform is not to try to emulate the characteristics of the minority who are getting somewhere under present conditions ... Rather, we must change existing conditions so that it is normal and possible for a majority of people to move forward (Fullan, 2001, p 268).

The TEC performance indicators (TEC, 2011) may have had a positive influence on institutional management throughout the sector, but they also are measures of activity at a very high level of abstraction and fail to motivate any change in pedagogy, including the role played by technology. The government caps on student numbers (TEC, 2009), imposed essentially to minimise the public cost of tertiary education, are also acting as a negative incentive to the adoption of technology. One of the clearest benefits of e-learning is the ability to increase the scale of education, increasing access by more students including those with other commitments such as employment or families. However, the Government has prevented institutional growth.

Institutions are now forced to consider how they can increase their internal efficiency in order to manage inevitable cost increases. Adoption of technology that increases costs even for transitional periods is increasingly hard to justify, particularly if it requires a degree of risk, as innovation inevitably does. This project highlights the need to adopt a systems-level view of e-learning (Seddon, 2008), rather than a technology- or performance-driven model. New Zealand tertiary education needs a return of a transformative vision such as that of the *Highways and Pathways* report if much of the potential of e-learning is to be realised. The eMM model is intended to help organisations realise the benefits of technological innovation and transformation through systemic and strategic organisational change, but there needs to be a reason for institutional leaders to take what appears to be a risky step. The results from these cases both illustrate the possible positive outcomes of change and show some of the reasons why it is necessary, even inevitable.

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Appendix A: Interview Protocol

Remind the person being spoken to that the interview is being recorded and get their acknowledgement on tape along with the interview.

Remind them they can end the interview at any time for any reason and can refuse to answer any question.

Organisational Change Questions

- [i] How long have you been involved with [organisation name]?
 - [ii] What roles have you had as part of that involvement?
 - [ii] Would you describe yourself as having a business, academic, professional or technical background?
-
- [1] What would you describe as innovative about way learning and teaching is done by [organisation name]?
 - [1a - if any specific innovations identified] Who would you say is responsible for those innovations coming into being?
 - [2] How are new ideas identified and discussed by [organisation name]?
 - [3] Have you observed evidence of change in how [organisation name] undertakes learning and teaching?
 - [3a - if yes] What sorts of changes?
 - [3b - if yes] Why do you think those changes were initiated?
 - [3c - if no] Why do you think change is not occurring?
 - [3d - if no] What would be needed to initiate changes?
 - [4] What changes do you foresee in the future of learning and teaching at [organisation name]?
 - [5] What approach do you think would be most successful in making a significant change to learning and teaching at [organisation name]?
 - [5a] Can you give examples of where in [organisation name] that approach has worked?
 - [5b] Does the involvement of technology mean that different approaches are needed?
 - [5c - if yes] How does technology change the approach?
 - [6] What role does technology play in learning and teaching at [organisation name]?
 - [6a - if any role identified] Why, do you think, does technology play that role?
 - [7] Would you say change in learning and teaching at [organisation name] is led?
 - [7a - if yes] Who would you say are the leaders responsible for change in learning and teaching?
 - [7b - if no] How then do you think change in learning and teaching comes into being at [organisation name]?
 - [8] How would you characterise student involvement and responsibility for changes to learning and teaching at [organisation name]?
 - [9] How would you characterise academic staff involvement and responsibility for systemic changes to learning and teaching at [organisation name] (beyond their own practice)?

Role-Specific Questions: Institutional Contact/CE/Senior Leaders

- [O9] Is there a defined strategic role of e-learning for learning and teaching at [institution name]?
- [O9] How is that strategic intent communicated to the staff and students?
- [O9] How would you describe the way that leadership support for the strategy is communicated to staff and students?
- [O9] Can you describe the process by which the strategy was developed?
- [O9] Who was involved in the creation of the strategy?
- [O9] What involvement do pedagogical/e-learning experts have in strategic planning relating to e-learning?
- [O9] How is engagement with the strategy in operational activities supported?
- [O9] How is progress towards the achievement of the strategic goals monitored and reported upon?
- [O9] What information is collected from staff and students regarding their experience of the strategy's impact?
- [O9] What is the process for revisiting and refreshing the strategy?
- [4°] How is the quality of the e-learning activities, processes and outcomes of [institution name] monitored?
- [5°] What are the mechanisms that drive improvements in the L&T/e-learning experience of staff and students and achievement of the L&T/e-learning goals of the institution?
- [O5/O3] Is there a detailed operational plan guiding the selection, deployment and use of e-learning technologies?
- [O5/O3] Is that plan formally endorsed/promoted by the leadership?
- [O5/O3] Does that plan have any milestones/performance measures that are reported upon?
- [O5/O3] What mechanisms (policy etc) ensure that use of technology is coherent between courses and programmes?
- [O5/O3] How is the success or other outcomes of previous investments in technology infrastructure and capability assessed?
- [S5] How are staff supported in developing their own skills in e-learning technologies and pedagogies?
- [D1] Are staff recognised and rewarded for their engagement with innovative e-learning projects?
- [O1] How are resources for e-learning identified and allocated?
- [O1] Are there formal criteria used to assess e-learning investment proposals?
- [O1] How is the linkage between strategy and investment maintained when resource allocation decisions are being considered?
- [O9] What role do risk assessments play in the planning and management of e-learning?

Role-Specific Questions: IT Director

- [O5/O3] Is there a detailed operational plan guiding the selection, deployment and use of e-learning technologies?
- [O5/O3] Is that plan formally endorsed/promoted by the leadership?
- [O5/O3] Does that plan have any milestones/performance measures that are reported upon?
- [O5/O3] How is the success or other outcomes of previous investments in technology infrastructure and capability assessed?
- [O1] How are resources for e-learning identified and allocated?
- [O1] Are there formal criteria used to assess e-learning investment proposals?
- [D5] How do you know whether the e-learning infrastructure is meeting the needs of the students, staff and institution?

- [S1] What technical support is provided to students?
- [S5] How does [institution name] ensure that all teaching staff have appropriate skills in using the e-learning infrastructure provided?
- [S6] What training and support is provided to staff working with digital materials created by students?
- [D7] Does [institution name] have formal processes and systems aimed at reusing e-learning materials created or licensed by staff or the institution?
- [D5] What is the process for maintaining and refreshing the e-learning infrastructure?
- [D5] Do you have service level agreements covering the e-learning infrastructure?
- [D5] Do you have a formal business continuity plan for e-learning?
- [D5] How are backups of e-learning materials/content verified?
- [D5] How your e-learning infrastructure audited?
- [D5] What role do risk assessments play in the planning and management of the e-learning infrastructure?
- [D6] What role do formal standards play in the planning and management of the e-learning infrastructure?
- [D6] What standards are available for staff to refer to?
- [D6] How are standards identified and selected for use?
- [D6] What support is given to users of the standards?

Role-Specific Questions: Librarian

- [S2] How would you characterise the involvement of the library in the e-learning activities of [institution name]?
- [S2] What involvement does the library have in strategic planning relating to e-learning?
- [S2] What library services are provided to students engaged in e-learning?
- [L6] How is the library involved in the support of students' development of research and information literacy skills?
- [S2] What support is provided to teaching staff to help them facilitate student use of library services?
- [S2] Is there a formal requirement that all students have access to specific facilities irrespective of the mode of delivery?
- [S2] How do you know whether the e-learning services provided by the library are meeting the needs of the students, staff and institution?
- [S2] What role do risk assessments play in the planning and management of the e-learning services provided by the library?

Role-Specific Questions: Student Support Manager

- [S1,S4] What support services are provided to students engaging in e-learning?
- [S1,S4] What involvement does the student services group have in strategic planning relating to e-learning?
- [S1,S4] What involvement does the student services group have in operational planning relating to e-learning, including course design and development and the selection of new technologies and infrastructure components?
- [S1,S4] What support is provided to teaching staff to help them facilitate student use of support services?
- [S1,S4] Is there a formal requirement that all students have access to specific support services irrespective of the mode of delivery?
- [L10,D4] How are the needs of disabled students addressed by [institution name]?
- [S1,S4] How do you know whether the support services are meeting the needs of the students, staff and institution?

Role-Specific Questions: E-Learning Design Team Leader

[D1] What support services are provided to staff engaging in e-learning?

[O9] What involvement do pedagogical/e-learning experts have in strategic planning relating to e-learning?

[D1] How is the decision made to provide support to staff for a specific project or course?

[D2] How are intellectual property issues managed during e-learning development?

[D3] Is a formalised process used to design and develop e-learning courses?

[3°] Do you have templates or frameworks that are reused between design and development projects?

[E1,E2] Do you routinely test courses with staff and/or students prior to deployment?

[L1, D3] What role do learning objectives play in the design and development of e-learning courses?

[D1] How are teaching staff supported in developing their own skills to design and develop effective e-learning experiences?

[D2] What role do formal standards play in the design and development of e-learning at [institution name]?

[D2] What quality assurance and review processes are used to guide e-learning development?

[D7] Does [institution name] have formal processes and systems aimed at reusing e-learning materials created or licensed by staff or the institution?

[D2] How do you know whether the e-learning design and development support services and resources are meeting the needs of staff, students and the institution?

[L10,D4] How are the needs of disabled students addressed by [institution name]?