Taking the Lead

Strategic Management for e-Learning

Contents

This project is intended to develop a set of resources and tools that will assist institutional leaders to plan and manage their use of e-learning more strategically. Much of the published research and analysis of policy and practice in this field has been authored by and targeted at teachers and information technology (IT) specialists rather than those responsible for institutional strategy and leadership. To begin to address this important audience, it is first necessary to identify the issues of significance for which they must take direct responsibility. This resource is an attempt to identify these issues and express them as questions that leaders should be asking of their institutional strategy, policy and practice. Case studies illustrating a number of these strategic options are drawn from across the New Zealand tertiary education sector.

The Commission

In the early development of e-learning, it is not surprising that research has tended to focus on the technical and pedagogical aspects of this technology. Research-funding agencies have supported this early and necessary focus of effort. As the technology has matured and as e-learning is making a claim to become a more integral feature of tertiary education, some commentators are beginning to identify other issues that need to be researched with respect to e-learning. In particular, they are noting the importance of institutional strategy and institutional leadership in encouraging and guiding the development of e-learning (Marshall, 2004).

The New Zealand Ministry of Education (MoE) has been supporting research into e-learning for more than a decade. One source, the Tertiary e-Learning Research Fund, has been funding research in this area since 2003. Each year applications are sought against a number of identified research themes. In most years these themes have included mention of funding models, leadership or institutional strategy, as well as a focus on pedagogy, staff development and technology. However, each year the funding awards committee has been disappointed by the almost total absence of applications exploring these more strategic themes.

In 2007, the Tertiary e-Learning section of the MoE decided to commission a project to begin to address this gap in the knowledge base. Specifically, it commissioned a small team, working under the aegis of Ako Aotearoa: National Centre for Tertiary Teaching Excellence, to develop a set of resources to assist institutional leaders to plan and manage their use of e-learning more strategically. The team comprised Dr Andrew Higgins, Director of e-Learning, AUT University; Tom Prebble, Emeritus Professor of Massey University, and Gordon Suddaby, Director, Centre for Academic Development and e-Learning, Massey University. The contract was finalised in August 2007 and was scheduled to run through to May and June 2008. The contract specified a number of areas that the resources should canvas and asked that the resources be illustrated with case studies from current practice among New Zealand tertiary education institutions (TEIs). The final outputs of the project include a written

report, a set of online resources, and an introduction of the resources to the target audience of senior tertiary leaders.

In August 2007 the research team began the study with a series of interviews with heads of peak education bodies and quality assurance bodies in the tertiary sector. These interviews helped clarify some of the strategic issues requiring attention and confirmed the lack of strategic guidance available to institutional leaders in this area. The team then began its work on the strategic resources and, in parallel with this work, began identifying and approaching heads of TEIs that appeared to illustrate some of the themes that were emerging. The case study interviews were short and sharp, focusing on the strategic issue and not attempting to canvass all aspects of an institution's e-learning activities.

The team developed a set of ethics protocols that were approved by Massey University, the host institution for Ako Aotearoa. These protocols set the terms for the gathering and publishing of data on the institutional case studies. In summary, these included two important conditions. The first was that case study institutions and, where necessary, individual managers might be identified by name. The second condition was that no case study account would be published without the approval of the designated senior manager from the respective institution.

Caveats and Acknowledgements

The team has been very conscious that this project has not conformed to the normal canons of empirical research. It has drawn heavily on the professional experience of the case study respondents and even more heavily on the experience of the members of the project team. This experience will almost certainly have coloured the findings and recommendations of the study.

We have attempted to mitigate this effect by adopting an interrogative structure for the report. The framework for the report is a list of strategic questions that institutional leaders should be asking about the strategic development of e-learning within their institutions. We have then discussed the significance of each question and answers that are likely to be available for each. In places, we have given stronger advice and argued for or against various options. Some of the target readership of this resource may disagree with our advice and even with our analysis. These are extremely complex and contingent issues and we should not expect common answers even to common questions. In some respects, if a reader is able to disagree strongly with any position we are taking here, it is an indication that the reader has seriously engaged with the analysis as well as with their own institutional context.

The second caveat has to do with the institutional case studies incorporated into the resources. These case studies are presented with the following qualifications:

- Each case study is intended to illustrate a single theme from our report. To achieve this end within a couple of pages of text, it has sometimes been necessary to present a partial and even over-simplified picture of the case institution.

- These cases are presented as examples of the themes in question, not as 'best' or 'worst' practice.

- Only some 15 institutions were invited to contribute a case study for this study. The cases were selected on the basis of the researchers' knowledge and advice from a small group of contacts about activity across the sector. This knowledge and the selection that took place will inevitably be limited. In many instances, readers may know of institutions that provide equally helpful or even better illustrations of the themes under discussion. We appreciate the generosity of those institutions that agreed to participate in the study and apologise to any institution that was not invited to do so.

- While the case descriptions are entirely the responsibility of the writers, the respondents in the various institutions were encouraged to correct any errors of fact or interpretation and to approve the final drafts of all texts.

The project team would like to acknowledge and thank the institutions that agreed to participate and be the subject of cases studies. Notwithstanding the assurance that they reserved the right of final veto over these case accounts, their cooperation was a brave and reassuring gesture in this immediately post-competitive era. We would also like to thank the team from the Tertiary e-Learning section of the MoE for their continued support for this project. Along with that thanks, we need to confirm that the judgements reached and advice proffered in these resources are that of the project team alone and not the official position of the Ministry.

The Themes

These resources take the form of a series of questions that institutional leaders should be asking of their strategies for e-learning. To provide some order to these questions, as well as some assurance that they are reasonably comprehensive, it is necessary to identify the themes from which the questions flow. The framework we have used is informed by the one adopted in the report of a working party convened by David Woodhouse of the New Zealand Universities Academic Audit Unit (NZUAAU) in 1999 (Butterfield, S. et al., 1999). The researchers found this set of categories particularly helpful for its emphasis on planning, administration and organisational structure. We have simplified this list to include:

1. planning and administration;
2. organisational structure;
3. staff development and effectiveness;

4. instructional design and development;

5. teaching and learning;

6. student support;

7. collaborative and international arrangements;

8. assessment and moderation;

9. technological infrastructure.

The project comprised five separate analyses of:

1. institutional strategies, planning and policies;

2. IT staff and student support systems needs.

3. quality assurance and professional development policies and operations;

4. curriculum and pedagogies models;

5. assessment and financial assurance models.

This report combines the data derived from these five analyses and presents them under the nine-fold category system developed by the 1999 NZUAAU study mentioned above.

Before beginning to consider these themes, it may be useful to consider the emerging national strategy that is informing funding and strategy in this area.

National Strategic Context

Tertiary education organisations (TEOs) are being encouraged to plan their activities on the basis of national priorities. These priorities are promulgated through various strategic and policy statements issued by the Tertiary Education Commission (TEC), the MoE and the New Zealand Qualifications Authority (NZQA) to mention just the major players. The topics of information and communications technologies (ICT), e-learning and the related areas of flexible learning and distance education have all been the subject of recent and ongoing strategic consideration.

Arguably, the key strategic statement in this area is the ICT Strategic Framework for Education, 2008-2012. This statement was published in 2008 and its implications are still being actively considered by the sector. The body of the document is less than ten pages long and deserves close consideration by all institutional leaders. It is not our intention to paraphrase it here other than to note that the policy is challenging the sector:

• to make optimal use of high-speed internet connections;

• to collaborate across the sector in the development and sharing of resources and services;

- to invest in and use shared digital repositories of content;

- to use ICT to support the provision of lifelong learning opportunities;

- to ensure that learners and teachers are proficient in a range of current and emerging ITs;

- to ensure that learners, teachers and administrators are well supported in their use of ICT in their work and that they learn to make effective use of emerging tools for online collaboration and communication;

- to ensure that all investment in ICT is measured against agreed standards for value-for-money.

The ICT Strategic Framework for Education sits within a broader context of government strategy. The following table, drawn from the Framework document, provides a point of access to the other key strategic documents.

Strategy	Relevance to ICT Strategic Framework for Education
The Digital Strategy – Creating Our Digital Future *http://www.digitalstrategy.govt.nz*	The Framework is based on the components of the National Digital Strategy: Connection, Content and Confidence (which includes Capability). It aligns with the Digital Strategy's overall outcome that all New Zealanders can enjoy benefits of ICT, including access to knowledge resources, digital skills and confidence to find and use information, seamless delivery of government information, services and processes, etc.
e-Framework for Education and Research *http://www.e-framework.org*	The Framework has been developed across the e-Framework's dimensions of Learning and Teaching, Research and Administration, and aligns with its development of common approaches to ICT infrastructure components in education and research.
Enabling Transformation – Strategy for e-Government 2006 *http://www.e.govt.nz/about-egovt/strategy*	The Framework includes targets around the delivery of services to the education sector, the provision of and access to reliable and secure information, the adoption of standards, the development of ICT skills and competencies frameworks, all of which are congruent with the aims of the Strategy for e-Government.
Creating a Digital New Zealand - New Zealand's Digital Content Strategy *http://www.digitalcontent.govt.nz*	The Framework's content targets fit with the Digital Content Strategy's goals around the creation, protection, accessibility, discoverability, sharing, use, comprehension, management and preservation of New Zealand's digital content.

Foundations for Discovery – Supporting Learning in Early Childhood Education through ICT *http://www.minedu.govt.nz/goto/10417*	*Foundations for Discovery*'s goals of sharing knowledge, accessing resources, introducing effective practices and systems, and assisting early childhood educators to become confident and capable ICT users are all captured by the goals and targets of the ICT Strategic Framework for Education.
Enabling the 21st Century Learner – An e-Learning Action Plan for Schools 2006–2010 *http://www.minedu.govt.nz/goto/10475*	The Framework is aligned with the broad goals of the e-Learning Action Plan for Schools, around ICT-assisted effective teaching; ICT-facilitated communication with families and whanau; evidence-based e-teaching practice promulgated across teaching community; sustainable and reliable ICT infrastructure in schools, supporting access to information and resources, improved management, planning and business processes and systems.
Taking the Next Step – The Interim Tertiary e-Learning Framework (ITeLF) *http://cms.steo.govt.nz/eLearning/Downloads/Tertiary+e-Learning+Framework/showall.htm*	The Framework broadly upholds the ITeLF's goals of the adoption of common technical standards; the institution of effective professional development around ICT; the development of national mechanisms/protocols for electronic rights management and sharing information and resources; and the encouragement and facilitation of online communities of interest.

Thematic Questions

1. Institutional strategy, planning and policies

It might be suggested that there are two key strategic questions that institutional leaders should ask of e-learning:

- Does your management team acknowledge that the rapid evolution of ICT will demand a fundamental process of strategic transformation of your institution?

- Does your institution have a well-defined set of operational strategies aimed at technology-enhanced responsiveness and associated organisational development?

We would take issue with the first question, which implies there is only one 'right' answer. It falls into the error that has bedevilled the discourse on e-learning for more than a decade: that of arriving at a solution before we have clarified the problem. An overriding objective of this project is to assist institutional leaders to clarify the questions they need to ask, and find answers for, before accepting a ready-made e-learning solution. It may be that, following this interrogative process, a management

team will readily acknowledge the need to transform fundamentally their institution to accommodate the coming role of digitally mediated learning and teaching. Having asked and answered these questions, that team should have a reasonable idea of how the transformation should take place. On the other hand, the answers they reach might suggest something rather less than a full-scale transformation is called for. In this case, they will have saved their institution a poor investment of time and resources.

The second question is closer to the mark. While it still assumes that e-learning must be an important factor for a modern TEO, it challenges institutions to ensure that they have an integrated set of operational strategies to ensure that this can take place. The point is worth emphasising because, in a great many institutions, it does not happen at present.

Most TEIs, with even one foot in the e-learning water, will have a published strategy on e-learning. These strategies will vary enormously in scope and emphasis, depending on the nature of the enterprise and their aspirations. These are important and necessary documents that provide a focused strategic statement about this important area of development and activity. Anyone seeking to understand how the institution plans to develop and use online technology to support its teaching programme should find this the most coherent and informative planning document available.

The problem with such documents is that, all too frequently, their themes and imperatives are not picked up and integrated with the other key strategic planning instruments of the institution. At worst, they are lofty statements of intent with few of the strategies, resources or processes required to put them into action. At best, they provide sound guidance and direction.

Institutional leaders with a serious commitment to e-learning should ensure that the strategic directions to be found in the e-learning strategy are strongly reflected and supported in the other strategic instruments of the organisation. These are likely to include the following:

- The institution's long-term strategy, annual plans and reports, and long-term financial strategy. These are the institution's public and internal statements about the nature of its business, its stakeholders and students, what it intends to do over the coming planning period and how it proposes to resource it. If e-learning is to be a significant activity, it should feature prominently in any and all of these documents.

- The institutional Investment Plan. This is the recently introduced process whereby each institution negotiates its funding for the upcoming period with the TEC on the basis of planned programmes, target markets and anticipated enrolment levels. The TEC has indicated its willingness to provide targeted funding to programmes

employing e-learning, so any institution wishing to further its development with this medium will need to feature these intentions in its Investment Plan.

- The Teaching and Learning Plan. This plan indicates how the institution will deliver its teaching programme and will canvas issues such as delivery modes, teaching support and assessment. Again, the e-learning strategy should be a component of the Teaching and Learning Plan rather than something that stands separate from it.

- There will be other functions and units within the institution that are critical to e-learning. The strategic plans for these should give appropriate attention to e-learning. These are likely to include the IT section, the capital budget planning process, the library, student affairs, learning support, institutional marketing, human resources and staff development.

- Risk management is another area of institutional planning and strategy that needs to take account of e-learning because it relies on technology and is an activity that can expose the institution to considerable risks should failure occur. Institutional planning needs to account for such an eventuality.

The exhortation to comprehensive strategic planning will not be especially helpful to busy institutional leaders. They should reasonably expect that specialist staff in the various sections of the institution would provide them with ongoing advice on all matters of institutional strategy and operations. The critical issue for a great many leaders is how they assess that advice. As the earlier strategic questions suggests, e-learning is a field more given to solutions than to questions.

Leaders need to ask the right questions about e-learning before they are in any position to assess the merit of the solutions that are being advocated. While the solutions that are being proposed are likely to be various and changing, the questions will be more generic. The purpose of this resource is to suggest what these generic questions might be and to encourage institutional leaders to ask them before accepting ready-made solutions. The answers to these questions should help institutional leaders arrive at solutions that fit the needs of their own institutions rather than accepting other people's solutions to other people's problems.

The first strategic questions often concern purpose and market:

1.1. What are your objectives for e-learning?

The most important question that institutional leaders need to ask concerning e-learning is what is hoped to be achieved through this medium – what are the objectives? If e-learning is the answer, what is the question? It is vital that institutional strategy builds on appropriate objectives, rather than being driven by seductive technologies and their passionate advocates.

There are generally only five objectives for an institution to introduce e-learning:

1.1.1. To enhance the quality of the student learning experience.

This objective is commonly expressed by a series of sub-objectives which reflect the range of functions that are possible to support through e-learning. For example:

- to provide students with ready access to course-specific learning resources;
- to provide students with access to more generic Internet resources and library services in support of their study;
- to provide a cost-effective medium for developing and sharing multimedia learning resources;
- to support a rich online discourse among and between teachers and students in support of the learning experience;
- to support the assessment of student learning on a continuous basis.

1.1.2. To improve access and flexibility of study for students

e-Learning has the ability to overcome some of the barriers of time and distance that commonly prevail in classroom-based teaching. Study can take place at a time and place that suits the student. Communication between the student and the teacher and with other students can take place at a distance and in either real-time or asynchronously. Students who may have difficulty meeting the requirements of campus-based study – such as those with disabilities, the house-bound and those in the workforce – are able to fit their study around their circumstances rather than the other way round.

1.1.3. To increase enrolments by targeting new groups of potential students

e-Learning lends itself well to promoting access to learning. An institution is able to service students beyond its normal enrolment catchment and can provide a more flexible suite of study options that generally involves a reduction in the amount of time students are required to attend class. An institution may embark on e-learning in the expectation that its enrolments will grow to foster lifelong learning.

1.1.4. To achieve improved efficiencies in the delivery of teaching services.

Institutions may hope to achieve some efficiencies through the introduction of e-learning. Some aspects of e-learning lend themselves to economies of scale. Once the initial investment has been made in the development of infrastructure and online courseware, and depending on the approach to tuition that is adopted, the marginal cost of servicing each successive student enrolment may be quite small.

1.1.5. To meet the service expectations of students, staff and stakeholders

Institutions may sometimes embark on e-learning because, in a competitive tertiary market, it is expected of them. At a time when the great majority of universities, ITPs

and other TEOs provide a basic level of support for e-learning, and both teachers and students have a growing expectation that they should be able to support their teaching and study online, institutions may feel compelled to do likewise. Institutions may also feel under some expectation from their funders to commit to this delivery mode.

These objectives are explored in more detail in subsequent sections.

At this point, institutional leaders should:

- ensure that their strategy for e-learning is based on objectives rather than solutions;

- accept that the e-learning objectives will vary across the institution's programmes but that each set of objectives should be consistent with the overall institutional strategy;

- understand that only the first, second and fifth of the objectives listed above are likely to be satisfied by their institution's e-learning efforts;

- accept that the objectives of both the institution and of individual programmes will change over time and should be subject to continuous review.

2. What is your intended market for e-learning?

This question can have several dimensions:

2.1. Are you targeting new or existing students?

It is very important to be clear whether a new e-learning strategy is intended primarily to service the institution's existing student enrolment or whether it is being mounted to attract a new group of students.

2.1.1. Programmes targeting existing students

Many institutions introduce e-learning in order to provide an enhanced, or differentiated, service for their current student population. They may do this for a number of reasons: to increase the range of study options and therefore flexibility for students; to improve the quality of their programmes by enhancing the range of teaching and learning services provided to students; to resist the competition from other institutions that are offering e-learning services; or to reduce their costs. Any of the first three reasons are legitimate reasons to commit to e-learning. The final reason – to reduce costs – is almost certainly not a realistic expectation to have from diversifying into e-learning. This will be explored more fully in the section on resources but the great weight of evidence suggests that, at best, an investment in e-learning will be cost-neutral for the institution. More likely, it will incur additional costs.

2.1.2. Programmes targeting new student markets

e-Learning is often introduced in order to attract additional students. This objective needs thorough scrutiny. There are probably just three opportunities for a conventional, campus-based, regional institution to grow its student enrolments through the introduction of some form of e-learning.

The first market would be people in the workforce needing to upgrade their vocational skills and qualifications and looking for an opportunity to do so in a part-time, flexible way. This group of people will either want to study fully by distance means or they will seek some form of blended learning delivery, where their time on campus is reduced and concentrated into blocks and their private study is supported by e-learning. The average regional TEI should be very cautious about venturing into e-learning solely with this first group in mind. The size of the market for independent distance learning is a limited one. Historically in New Zealand, this market has been served by just two or three providers. New providers in this market are likely to find it very difficult to attract enough of a market to justify their expenditure. Regional institutions have been much more successful in attracting students from their own region by an appropriate blend of concentrated campus-based study and e-learning. This form of delivery takes advantage of the institution's regional location but accommodates the students' other time commitments.

The second market might be in those subject areas where the institution is a strong market leader, or where it is one of only a small number of providers. In such instances, students may be attracted from outside an institution's region.

The third market might be in a vocational subject where the total number of students, even at a regional level, is potentially quite large. Currently, the most obvious example of such a subject would be business studies and the response from the sector is instructive. Attempts by individual Independent Tertiary Providers (ITPs) to offer the New Zealand Diploma in Business by e-learning have been expensive and not remarkably successful. Providers are now collaborating to design a common online programme for which individual institutions can offer tutorial support to local students. There may be a small number of other subjects that would offer sufficiently large enrolments to justify such an approach.

In summary, there are only a few opportunities for institutions to grow their enrolments substantially by offering e-learning. They need to be very confident in the size of these markets and of their ability to attract them before committing to a growth strategy.

2.2. Are you targeting students studying primarily at a distance or primarily on campus?

This is a key question to address. Many institutions engage in e-learning primarily to support their campus-based teaching. They do so to provide students with ready access to course material, library resources and the Internet. They may also want to allow greater support for course-related online communications by way of email, class discussions and group project work. They may want to take advantage of some of the administrative and evaluation tools that are available through an online Learning Management System (LMS). They may intend to use e-learning to provide teaching staff with greater flexibility in the timing and intensity of conventional face-to-face tuition.

In the on-campus cases, e-learning is being used to support, rather than to replace, the face-to-face delivery of teaching, communication, assessment and administrative services. This is a valid reason for an institution to invest in a level of e-learning support for teaching and learning. However, it has some implications for the institution's assessment of cost and economic return from this development. It may also have some implications for the extent and standards of service the institution will attempt to assert using this medium. In short, if e-learning is being used to supplement rather than replace a given model of campus-based teaching and learning, the cost of these additional services may be a more pressing issue than the uniformity or even the quality of that service. In the worst case, if the e-learning medium fails to deliver a quality service, the students have the face-to-face service to fall back on.

Alternatively, the institution may plan to use e-learning to be the principal medium for teaching, assessing, supporting and managing students studying at a distance or independently of face-to-face, campus-based teaching and support. This option imposes a much higher threshold of service delivery on the e-learning system than does the previous case. There are various models available to guide an institution in its assessment of the full extent of these services and capabilities. The national New Zealand e-Learning Guidelines (elg.massey.ac.nz) provide a substantial source of questions and information about the use of e-learning strategies. Another New Zealand-based model that is attracting growing support is the e-Learning Maturity Model (eMM). In summary, the eMM identifies five sets of processes any institution should have in place to provide effective delivery and support for e-learning:

- processes that ensure that teaching and learning online follows the most appropriate pedagogic practice;
- processes that ensure that online courses are well developed and are delivered within a well-designed and robust framework;

- processes that ensure that both students and staff are adequately supported in their efforts to teach, learn, communicate and manage within an online environment;

- processes that ensure adequate evaluation of online programmes and teaching;

- processes that ensure that online programmes are well planned, resourced and managed within an appropriate institutional or unit strategy.

This important question of quality and standards will be explored in a later section. The key question to resolve at this point is whether e-learning will be employed as a supplement to conventional campus-based study or whether the intention is to use it to provide the primary medium for the teaching and support of off-campus students. In most cases, the answer to this question is likely to be 'both', in which case it will be important to determine the balance between the two. There is a range of possibilities between the two extremes. Most of these possibilities will be variants of another two broad options, each of which has quite different implications in terms of institutional strategy, standards and support.

The first option entails providing an optional 'online' stream to provide a distance education choice for an unspecified number of courses that are otherwise designed with campus-based delivery in mind. This is a high-risk and ultimately a high-cost strategy. The risk is incurred by committing to provide an acceptable level of service – in all the categories specified by Marshall and others – across an unspecified array of individual courses and programmes. Most institutions will find it very difficult to meet these standards right across their portfolio of programmes. The cost will be incurred in being forced to deliver and support an extensive set of design, delivery, support and management processes for what is likely to be only a modest online enrolment across a great many programmes.

The second option entails identifying a given number of programmes for delivery primarily to off-campus students by e-learning. This option allows an institution to identify and target programmes that offer good prospects of strong online enrolments and to focus the provision of online support services on these particular programmes. Conversely, it avoids the risk and the expense involved in committing a similar level of investment to converting courses with few prospects of attracting sustainable online enrolments.

This question is of critical strategic importance to any institution. While the answer may change over time, it is important that it continues to be asked and answered at a strategic level in the organisation.

2.3. Are you planning to offer this programme offshore?

e-Learning appears to offer institutions the prospect of participating in the global education market. New Zealand qualifications are generally well regarded internationally and e-learning would seem to be a cost-effective way to take these qualifications to a huge potential market. Institutions considering entering this market need to consider the following:

- Offshore enrolments will not attract government funding and will therefore need to be charged at full cost.

- In most international markets distance education, by whatever mode, is seen to be a second-class option and commands a seriously discounted fee structure.

- The provision of online and distance education in Asia is dominated by a small number of very large-scale, specialist distance education providers from within the Asian region. These institutions offer high-quality programmes at low cost to the students.

- Most international students considering studying with a New Zealand institution are interested in gaining higher-level academic qualifications and not in 'cherry-picking' individual courses. This means that any New Zealand provider needs to commit to offering an entire qualification over the medium-to-long term.

- China, New Zealand's largest potential market for this form of delivery, has a system of licensing that will not recognise distance or online qualifications delivered unilaterally by New Zealand providers in 2008.

- The legal, regulatory and servicing complications associated with offshore provision of distance education are labyrinthine.

- International consortium arrangements for the delivery of online qualifications are struggling to arrive at an effective business model for their work and consortium members are still waiting to see any significant return on their investment.

Very few New Zealand providers have had any success in this market. There are some instances where institutions are using e-learning to support some form of 'twinning' arrangement with an offshore provider. But in most such cases, the predominant delivery mode is face-to-face, with the New Zealand provider offering only additional support online. The offshore component of these relationships seldom yields any financial return to the New Zealand provider, their economic viability depending entirely on the New Zealand-based component of the students' programme.

2.4. What is the scope of your institution's plans for e-learning?

This is a two-dimensional question. Which of the institution's programmes will use e-learning? And what kind of services will these programmes commit to?

These may be difficult questions to answer definitively and finally. Most institutions begin their involvement with e-leaning on a small scale and grow this use over time. At these early stages, e-learning can be treated as a pilot. Targeted resources can be provided on a one-off basis. A small, enthusiastic project team can provide most of the necessary production and support effort. Participation can remain entirely voluntary, and the project can be allowed to run largely independently of the institution's normal servicing and administration systems.

However, as the scale of the activity increases, teachers start to ask for professional development, for time in which to develop online resources, and for appropriate software and network services. Service units within the institution seek to upgrade their capacity to cope with the new demands of this medium and the need to articulate it with their own information systems. As e-learning becomes the rule rather than the exception, issues of standards and expectations come to the fore. The institution is driven to ensuring a closer integration among the various teaching, service and administrative systems and e-learning becomes core business rather than a value-adding option.

Depending on the stage each institution is at in this process, and the rate of uptake it anticipates in the future, the leadership will be faced with another set of questions and challenges to do with resourcing, management and policy. These questions are discussed at more length later. At this stage, the important question leaders need to ask is: how big a part will e-learning play in this institution over the next few years? Will it remain an optional extra adding value to a handful of our courses, or is it likely to become our core business? It is not suggested here that there is a universally right answer to this question. It is a question to which each institution needs to find its own answer.

2.5. Does your strategy actually require any e-learning to take place at all?

This oddly phrased question is designed to alert institutional leaders to a common shortcoming in e-learning strategies. Many strategic statements focus almost exclusively on developing institutional capacity to develop, deliver and support e-learning rather than giving at least equal treatment to the more important question of how they plan to use this capacity. This conclusion is supported by the recently published *Report on the Distance and Flexible Education Capability Assessment of the New Zealand ITP Sector* (March, 2008). Governments tend to focus on building capability in terms of networking, connectivity, standards and policy and funding models. Institutions tend to focus on developing end-user connectivity, campus

networking, software support, instructional design and staff development. Admittedly, institutions need to develop a level of capacity before they can engage in e-learning, but this capacity-building is a necessary rather than a sufficient foundation for an effective e-learning programme. 'If we build it, they will come' is a metaphor that has not served e-learning at all well. Most of our larger TEOs now have the capacity to support a far richer, more extensive provision of e-learning than is in fact being offered. One reason for this shortfall in performance may be that institutions frequently neglect to specify with any precision how they intend to use e-learning, which programmes will employ it, with what functionality and directed at what student market.

These questions will be explored in later sections of this resource. At this point it is sufficient to ensure that strategy is a guide to action rather than a commitment to provide the means for action.

> The case studies identify a range of response to the need to drive e-learning strategy from core institutional strategy. Otago Polytechnic provides an example of strong strategic direction at a corporate level. Otago University is an example of an e-learning strategy nested within a Teaching and Learning Plan which is in turn nested within a University Strategy, each level of which is monitored and driven by a governance group. Canterbury University avoids the danger of technology capture by not developing an explicit plan for e-learning at all, preferring to drive all planning for e-learning from their broader Teaching and Learning Plan. Te Whare Wānanga O Awanuiārangi is using e-learning to support its strategic mandate to provide educational services on a national basis. Many of the other case studies illustrate aspects of strategic planning as well.

3. Organisational structure

3.1. How should e-learning be managed within the institution? Specifically, who should be responsible for what?

Conventional classroom teaching requires a very straightforward allocation of roles and responsibilities. Once a teacher has been allocated a class of students, a timetable and a classroom, they are left to get on with it, the institution only intervening at the end of the course to coordinate the final assessment process. Historically, this dynamic has divided institutional staff into the two camps of teachers and administrators. e-Learning places more complex demands on the teacher and the institution and tends to blur the line between the two camps. These roles include the:

- development of online teaching resources, some involving complex multimedia programmes and models;

- management of a learning and teaching discourse which engages the teacher and students;

- assessment of students' work;

- management of a LMS;

- management of an institutional network to support e-learning;

- training and support of online teachers and developers;

- support for students in maintaining connectivity with online services.

Broadly speaking, institutions need to choose between two ways of allocating these roles. The first approach, and one advocated by much of the literature on e-learning, favours a team approach to the matter. Online courses are developed by a team, comprising variously a subject expert, a learning materials specialist, a web development specialist and perhaps someone to manage and coordinate their various efforts. The teaching and assessment of the course itself could continue to utilise the subject expert, or it might employ a second team of contracted markers and tutors. This is a highly successful model, particularly suited to courses with annual enrolments in the hundreds and higher.

The second approach, and one employed far more commonly in New Zealand institutions, is for the individual teacher to assume most of the previously mentioned roles of subject expert, instructional designer, web developer, project coordinator, tutor and assessor but to be assisted in some of these tasks by occasional training and guidance from others within the institution.

The advantage of the first approach is that it should ensure a universally high quality of course materials and a well-planned and timely delivery of service. Its most obvious disadvantage is its cost and the need to invest much of this expense before the first student is even enrolled. Another less obvious drawback of this model is that it is not a familiar one for the typical tertiary teacher, and teachers will often resent the fact that they are required to relinquish their control of course development to a team process.

The advantage of the second approach is that the teacher retains strong ownership of every aspect of planning, developing, teaching and assessing the course. It is also likely to be a good deal cheaper and more expeditious than a team approach. On the other hand, it places new and unfamiliar demands on the average teacher and many find it very challenging. The quality of the online course is also likely to be more variable compared with a team approach to production.

So, the first question is where an institution will seek to place itself on some sort of continuum between expecting the teacher to carry the entire burden of course development and assigning all such tasks to a full production team. The next question is how the institution provides the other roles identified above, specifically

network provision, management of the LMS, the Content Management System (CMS), training and support for online teachers, and connectivity support for students.

Most institutions will want to assign the first two roles to their institutional IT section. There are major issues of network security and risk management that institutions may not want to be dispersed more widely across the institution, not to mention the arcane demands of these activities. For slightly different reasons, most institutions will want to provide some sort of central helpdesk to provide technical support for online students. Few teaching staff will be able to provide effective and timely assistance to students phoning in about connectivity and registration problems and even fewer will be happy to be asked. Finally, the institution needs to decide how much training and support it provides to teachers in the development and delivery of their courses and where this support should be located. Some institutions opt to base any such support in a specialist central support unit. Others choose to locate this kind of expertise across the major teaching divisions of the institution.

3.2. Where are decisions made about what will be taught and how it will be taught?

The previous question had to do with the various tasks that need to be carried out in order to deliver a programme involving e-learning. It was suggested that institutional responses to this challenge fall along a rough continuum from an integrated production team approach at one end, where a group of specialists is brought together to develop a set of e-learning resources, through to a more dispersed model where individual teachers accept primary responsible for developing and teaching their e-courses but are able to draw on a range of central services to assist them in their efforts.

This next question raises the related issue of who in the organisation makes the decision about what courses will employ e-learning technology and what sort of e-learning services they will offer. What is the locus of decision-making about what gets taught in this medium? The answer to this second set of questions will fall along a similar continuum to the last one: from decisions made at a central institutional level right through to decisions made on a course-by-course basis by individual teachers.

This question about the locus of decision-making for what gets taught by e-learning, and how it is taught, is one of the most critical issues in this field. Commonly, initial decisions about e-learning delivery are made on a highly dispersed basis by individual teachers and programme leaders. They are driven by enthusiasm and market opportunity. Heads of department, deans and leadership teams often only become involved in these matters as the number and range of courses grows along with the servicing demands and costs associated with them.

Institutions need to review this question of locus of decision-making at an early stage in this development. Generally, key questions about what gets taught by e-learning and how it is taught should only be asked at the programme leadership level and above. Further, such decisions should apply on a programme-wide basis rather than individually by course. This proposition requires some justification.

From the students' perspective, they should be able to expect some continuity of service across their experience of a programme or qualification. If they are expected to use a given LMS in one course and learn to employ a certain set of online study and communication skills during that course, they will have a reasonable expectation that their experience will be similar in subsequent courses.

From an institutional perspective, it is unrealistic for an organisation to support a range of different LMS, service standards and network requirements in its provision of e-learning. Most institutions should come to the view fairly early that decisions about e-learning scope and servicing should be made at least at the programme level and on behalf of the entire programme. Most positively, this will mean that every course in a given programme will subscribe to a similar commitment to online services and standards. Less positively, some enthusiastic teachers may need to be discouraged from unilaterally committing to a challenging level of e-learning in their courses.

To a greater or lesser degree, all the universities represented among the case studies tend to leave the decisions about the use of e-learning to the individual teachers. Whitireia Regional Polytechnic provides an example of an institution deciding as a matter of policy that decisions about utilising e-learning will be made on a programme basis and that the institution's support services will be targeted at the programmes and programme teams rather than individual courses and teachers. The Open Polytechnic is an example of a highly centralised corporate approach to managing e-learning. All decisions about e-learning are made by the senior executive team on the basis of thorough business plans prepared on a programme-by-programme basis. It is the senior executive team that is driving the uptake of e-learning at Otago Polytechnic as well, though here there is greater use of targeted central funding to assist programme teams in making the change.

3.3. How is leadership exercised over e-learning at an institutional level?

Many commentators identify the presence, or absence of strong institutional leadership as a critical factor in the successful uptake of e-learning. A failure of leadership might stem from a lack of appreciation of the importance of this development. Just as commonly, the failure may arise from inappropriate reporting relationships. The temptation is to view e-learning as primarily a technological issue and to assign responsibility for its growth and management to the IT division of the

institution. In fact, technology is simply an enabler for a teaching process. For this reason leadership for e-learning needs to fall within the academic management line. It makes little sense to plan for e-learning as something separate from the institution's mainstream processes for planning and delivering every other mode of teaching and learning. The team responsible for leading an institution's teaching programme, for deciding what gets taught, how it gets taught and how well it gets taught, also needs to be responsible for managing this important medium of teaching and learning.

This will pose a challenge for most institutions. While it is important for senior academic leaders to accept responsibility for the direction and development of e-learning, it is equally important that the contribution of IT and other administrative services are coordinated with a common purpose in mind. This is where it becomes vital that the institution's strategic documents give prominence to the place of e-learning and the contribution that all divisions of the institution will need to play in its development and management.

Some institutional leaders seek to resolve this problem by escalating the matter to a responsibility shared by the senior leadership team. Another option is to appoint a member of the senior team as 'champion' of the institution's e-learning strategy, assigning that individual some strategic targets, drawing together the necessary managers into a standing project team, and then requiring regular progress reports to come back to the leadership team. In either case, the aim is to ensure that all relevant managers are made accountable for the strategic targets that have been set for e-learning.

3.4. What is the role of middle managers (deans, heads of department, programme leaders) in e-learning?

There is a continuing debate among e-learning professionals and policy-makers about the reasons for the slow take-up of e-learning by some tertiary institutions. This is blamed variously on poor infrastructure, a lack of national policy, weak institutional strategy and leadership, and inadequate professional development of teachers. Arguably, a renewed focus on the responsibility of academic middle managers for the work of their teacher colleagues would be every bit as effective.

The most effective e-learning programmes tend to occur where a whole programme team makes a commitment to develop and deliver their courses to a shared set of guidelines on service and standards. This kind of collective commitment generally only comes about when team leaders understand that their core responsibility is to exercise leadership over the work of their team, which is teaching. In spite of this fairly obvious fact, we continue to see the issue of uptake as primarily one of personal choice by individual teachers. Working from this rather dubious premise, we assume that the best way to improve uptake is to focus our professional development efforts on these individual teachers. Institutional leaders should review and highlight

the role they expect these academic middle managers to play in e-learning. If these expectations are very modest, leaders should not be surprised if their middle managers do not see it as a significant responsibility of their role.

The case studies demonstrate a variety of organisational arrangements for supporting e-learning. The University of Auckland has brought its e-learning support unit into a larger aggregation, comprising all the teaching and student support units. Universal College of Learning (UCOL) has recognised the central role of the Library in knowledge management and is locating its e-learning support services within that unit. The AUT University case is an interesting example of a senior manager seeking to exercise strategic leadership over his institution's teaching and learning activities, including e-learning. Northland Institute of Technology (NorthTec) provides an example of this leadership being driven strongly by the Chief Executive. Bay of Plenty Polytechnic and Manukau Institute of Technology (MIT) are instances of strong leadership being exercised at the e-learning support unit level.

4. Resourcing

4.1. How should e-learning be resourced within the institution?

This is one of the most critical and also the most difficult management challenge concerning e-learning. Typically, institutions begin their foray into e-learning in a small-scale, experimental way. A unit or individual expresses enthusiasm to offer their programme or course using this medium. They are permitted to run some kind of pilot programme and they either do so under their own resources or else the institution finds a small amount of funding to get the project started. At this early stage, it is unlikely that much consideration will be given to how this activity might be funded in the long term and at a much larger scale.

The pilot is likely to be a critical success. The original enthusiasts remain enthusiastic, students in the pilot programme seem to survive, and other programme groups across the institution start to show an interest in doing something similar. At the same time, a number of 'gaps' in service and support begin to be identified. Teachers start to press for the purchase of a fully functional LMS for the institution and for support in developing online teaching resources. Students start to complain about difficulties they face in establishing connectivity with the e-learning systems. The IT section begins to seek more resources for new servers, for staff to manage the new activity and even to upgrade the campus network services to accommodate the extra digital traffic. Auxiliary services, such as the library, student learning services and enrolment services, start to point out the difficulties they face in delivering their services to e-learners. At about this point, institutions need to make a choice as to how they intend to resource, plan and manage their expanding use of this mode.

The first option is to 'ring fence' the resourcing and management of e-learning and treat it as a centrally planned, centrally resourced and largely stand-alone stream of activity and funding. Under this approach, institutions will commonly establish a centrally resourced and directed e-learning unit. This unit will be charged with commissioning, developing and possibly even delivering e-learning programmes on behalf of the institution. The unit will be given an allocation which it uses to hire a production team and then, perhaps under the guidance of some sort of advisory board or management reporting line, identifies a few programmes to convert to e-learning. It will then collaborate with the teachers from the identified programmes in the development of the teaching materials and support services.

There are several strengths to this approach:

- The institution is able to target its efforts to a few key programmes that will best serve its larger strategic interests.

- Development will be relatively rapid with a well-planned concentration of resources and effort to get the new programmes in place according to schedule.

- High standards of production, presentation and support can be maintained.

- All necessary services can be purchased and coordinated to ensure the success of the programme.

- Costs can be tracked and contained within allocated budgets.

On the other hand, the approach has some serious limitations. In recent years, most tertiary institutions will have moved to a system of devolved funding and accountability. Teaching units are funded largely on the basis of the revenue they generate through student fees, government fee subsidies, research and commercial activity income. They are expected to manage their activities within that income. Institutional overheads are resourced either by an initial 'top slicing' of revenue or through some form of 'contribution' levied on each income-generating teaching and research unit. This is a robust and demanding model that has forced an unprecedented level of accountability on individual teaching units. Unit heads are now forced to make constant choices about programme viability and staffing requirements whereas, under earlier regimes of central institutional funding, these choices were made at a more senior level. Operating under these conditions, programme leaders will be alert to any proposal by the centre to fund a new activity by top-slicing some of their income. Any funding model that resources one stream of teaching from a top-sliced central budget but which continues to expect the teaching units to resource their other modes of delivery from their allocated revenue is bound to cause distortions in perception and behaviour.

Another disadvantage of this model is that it is unlikely to be self-perpetuating or self-funding. While the institutional leadership may believe that the activity should

become self-funding after the initial injection of central start-up funding, the experience is likely to be otherwise. The history of such production units attempting to charge teaching units for their services is not an encouraging one. Once the central funding stops, such units tend to disappear quite quickly. In their place, individual teaching units may be reluctant to budget for the development of e-learning from already hard-pressed budgets, particularly as they have recently enjoyed its provision at no direct cost to themselves.

The other option is to challenge teaching units to meet most of the development and servicing costs of e-learning from their regular student-generated revenue while limiting the use of top-sliced funding to key network services, connectivity support, and training and advice for teaching staff.

The advantage of this second approach is that teaching units will be encouraged to view the development of e-learning as just part of their wider commitment to teaching. Decisions about e-learning will be carefully assessed against other alternative delivery modes and choices will be made on both educational and economic grounds. This suggests that progress in this direction will be more enduring than any commitments made on the basis of opportunistic funding. This model of funding will mean that teachers and teaching teams will be making most of the key decisions about how and what they deliver by e-learning. They are also likely to be more directly involved in planning and developing courseware. This may encourage a greater sense of ownership of the courseware and of the mode by teachers than the alternative approach. Finally, this approach will allow a more flexible approach to the evolution of blended learning across the institution where such developments are not constrained by the existence of mode-based funding silos.

Unfortunately, a devolved model of resourcing has some serious limitations as well:

- Uptake across the institution is likely to be slow and uneven as units vary in their investment in support and encouragement for this mode.

- The quality of courseware and support for e-learning will also be variable and generally lower than what might be achieved by the former approach.

- Some of the developments will be idiosyncratic as individual teachers pursue particular systems and functionality.

- Developments in e-learning will be difficult to monitor and even harder to standardise.

As with most such dilemmas and choices facing managers in this field, the answer probably lies somewhere between the two alternatives as described. Institutions may need to fund a few initial programmes to explore what is possible, to develop some exemplary courses and to develop and test a few support systems. However, they need to recognise that this will not be an enduring or scalable funding model, and

that they need to challenge teaching units to take early and major responsibility for planning, resourcing and manning the development and delivery of their online courses. To maintain the momentum, they need to have a realistic institutional plan for e-learning, to develop a clear set of delivery and service standards and give strong central support. This support will include network services, system hosting and security, connectivity support for students, and continuing training and advice for teachers.

The current reforms in the resourcing of tertiary education in New Zealand may prompt institutional leaders to reconsider the methods they use to resource e-learning. Public funding of tertiary education will now be driven by institutional plans and the government's commitment to invest in these plans. Numbers of student enrolments will no longer be the sole driver for government funding of tuition. Institutions are being required to indicate in their plans, not only which programmes they intend to offer and to how many students, but also how they propose to teach these students. Funding will be allocated with the expectation that the programmes will be delivered in accordance with negotiated plans. This is likely to mean that the internal allocation of resources within tertiary institutions will need to conform closely and transparently to the approved Investment Plans. Institutions will not be able to continue to fund their teaching units on the basis of EFTS when the expectations of the public funder are for targeted delivery of particular programmes to agreed numbers of students. It is likely that institutions will be encouraged to be more explicit about their plans for e-learning in their bids for investment funding. This may well encourage both institutions and funders to favour a more targeted, centrally supported process for managing, funding, producing and even delivering e-learning.

4.2. What will it cost?

The answer to this question is either very complicated or fairly simple and it tends to depend on the resourcing model employed. Much of the expert advice on costing e-learning tends to come from people associated with large-scale, dedicated distance education institutions. It reflects the models of central planning and resourcing typical of such institutions, and the high production and service standards that are possible given their scale of operation. They will argue that the development of e-learning programmes requires a production team approach (see above), that the e-learning programmes should take advantage of the full range of delivery and communication functionality that is available through modern LMS, and that the institution needs to provide an equally rich suite of online student administration services (see following section). This sort of analysis will generally advise that the development costs of an e-learning programme are far higher than for conventional classroom teaching and somewhat higher than for paper-based correspondence study. Further, they will suggest that the marginal cost of each student enrolment is higher than for correspondence study (because of the greater demands on teachers from online communication with students) which means that the break-even enrolment level for

any course will be similarly higher than for either face-to-face or correspondence delivery. In other words, e-learning will be more expensive but better than other modes of delivery and only the largest institutions can expect to achieve any economies of scale.

There is an alternative view that tends to be demonstrated, at least implicitly, by institutions adopting a devolved model of funding for e-learning. In a perfect model of such a system, an e-learning course will, by definition, be the most cost-effective delivery stream for its targeted market. Otherwise the unit would have chosen a more cost-effective way of reaching that market! This may appear to be a smoke-and-mirrors statement but it is borne out in practice. Where a teaching unit is resourced largely on its student revenue and where it is given a measure of autonomy as to how it delivers that teaching, it will seek a delivery mode that is most cost-effective given the characteristics of its student cohort and the demands of teaching the subject. The choice of mode will be influenced by imposed standards of course and by a professional desire to improve the quality of teaching, but an overriding criterion will be the funding available to provide the service.

Contrary to the advice of the e-learning experts about costs, there are dozens of institutions across New Zealand that are delivering e-learning programmes at well below these suggested minimum costs. They do so by building their courses within their available resources, rather than aspiring to offer the most fully functional set of teaching services. Regular teaching staff develop their online teaching resources with only light-handed assistance from instructional developers. They forego many of the more sophisticated functions and utilities offered by their LMS and they limit their online correspondence with students to the time they have available. Most importantly, they try to avoid simply adding costs as they add value to their teaching efforts and look for ways in which e-learning allows them to economise on some other teaching activities. In short, teaching units learn to live within their means. If an e-learning programme begins to consume a disproportionate amount of unit resources, sooner or later funding pressures will force some form of retrenchment or reallocation of resources. And institutional and external quality assurance processes should ensure that, by and large, e-learning courses meet reasonable standards of delivery and support.

The aspect of resourcing that needs closest attention in terms of managing costs are those top-sliced activities that are the responsibility of central units and that fall outside the direct control of revenue-funded teaching units. The upgrading of network services to accommodate e-teaching and e-learning; the purchase and management of an LMS and the hosting of e-courses; the delivery of some form of helpdesk for students; and the development of a training and instructional development capability are all instances of significant costs that are incurred explicitly to support e-learning. To what extent can these costs be offset against savings in classroom and campus for conventional teaching methods? More difficult to weigh in

this calculus are the development of other online services that are of particular value to distance students and others studying principally online – such as online library access and online student administration services – but which are also of considerable value to students studying principally in a classroom environment.

The simple answer to the initial question then is this: given a devolved model of funding and accountability, and careful management of central support services, most institutions should be able to afford to develop e-learning services where they are most needed.

4.3. No, what will it really cost?

In spite of the preceding discussion, institutional leaders will want some indication of what e-learning is likely to cost them. The following analysis, drawing on the experience of a large tertiary institution, may be of some help. Each institution will have its own accounting regime in terms of both capital and operational costs. Institutions will also differ both in size and the extent to which they engage in e-learning. For this reason, only general statements can be made about costs. Instead, the allocations of costs will be expressed as percentages and proportions rather than dollar figures.

Broadly, there are four areas for consideration. First, the cost of creating an IT environment in which any LMS might operate, including maintaining that system when functional. Second, suitable software that meets the institution's needs must be acquired. Third, experienced staff need to be hired or redeployed to provide pedagogical support to those taking on e-learning. Fourth, staff and student support personnel must be available to those who need it.

Table: Proportional costs of e-learning in a large New Zealand tertiary institution

Activity	Fractional cost
Information Technology (central services)	**8.2% of total cost**
Staff to maintain servers and perform upgrades. This cost does NOT include helpdesk staff time.	40% (half a full IT specialist salary)
System server leases	11%
Supplementary servers, load balancers etc	7%
LMS server	30%
CMS server	8%
	100
Flexible learning/staff development	**59.7% of total cost**
HR costs	81

Teaching support salaries	62%
Admin and LMS support salaries	38%
	100
Internal charges	**2.2% of total cost**
Internet	55%
Print/copy	9.7%
Local user charges	32%
Misc	3.3%
	100
Administrative expenses	**3.7% of total cost**
Equipment	3%
Equipment lease	23%
Staff development/conferences	25%
Travel	27%
Accommodation	9%
ACC/Long Service/Misc stationery etc	13%
	100
Blackboard infrastructure	**1.8% of total cost**
Internet connections	62%
User charges	38%
	100
Licences/Contractors	**24.6% of total cost**
Contractors	0.6%
Equip rental	0.5%
Licences (Commercial LMS/CMS)	98.9
	100

These data make it clear that the bulk of the costs associated with e-learning are in staffing, almost 60%, and in licence costs, at 25%. The uncalculated cost is that of staff time in preparing e-learning materials or in modifying existing items.

Central services

The central services cost is almost equally divided between server acquisition and lease costs, and salary costs maintenance and upgrade. There are other internal and external charges mandated by the system that are unavoidable and not reported in detail here. It would be fair comment that whatever LMS is operated by an institution,

the central service costs would arise if the institutions runs its IT system centrally. The salary position not only maintains the servers but also ensures that links are maintained to other institutional systems such as the Student Management System (SMS), library, student identification and security systems etc. This role is particularly important when any other student-related system in the institution is being modified or upgraded, or if a related system goes down because that role ensures the continuing integrity of the whole system. The position can be divided into two fractions of a half-time role to ensure that one person can support another in case of absence or illness.

Flexible (e-learning)

In the instance quoted here, flexible and e-learning are located under the administrative wing of the staff development unit but overseen by a director of e-learning. The largest costs are those associated with flexible learning advisors who work with academic staff in faculties on transforming their learning and teaching using the LMS and other associated e-learning software. This team is supported by a smaller group of staff who provide expert advice to the helpdesk and to academic staff using high-end LMS/CMS strategies. They also manage software-related issues at the more complex end of the spectrum. They use the LMS software on test bed servers to trial new software before it is put onto development systems in the IT environment, prior to final release on the IT production servers. This team also uses the bulk of the funds attending conferences and meetings to ensure they have the most recent knowledge about flexible and e-learning, and sometimes present papers to academic meetings.

Major software

The third major expense related to e-learning is the LMS software. The particular institution from which this data is drawn uses a commercial product. It is well supported and frequently improved by the vendor, hence the pro rata licence cost based on the number of institutional full-time enrolments. Some institutions use open-source software that is free to use. Experience so far suggests that experts have to be hired to make changes to the software to accommodate upgrades in related (e.g., ,student information systems). Similarly, the staff are used to modify and improve the product to maintain parity with similar products on the market. There is insufficient information at this time to indicate whether the additional staff costs to write new code in the open-source environment are more or less expensive than the licence costs for commercial software.

The institution in question found the following questions both useful and challenging:

- Are the proponents and champions for e-learning aware of the establishment costs?

- Is there a clear understanding of what costs are capital and what are operational?

- Is there a longer term (e.g., five-year) implementation plan showing all the downstream IT costs?

- Have the HR costs been fully examined in terms of direct staff appointments?

- Can existing staff be redeployed at no additional cost?

- Is there a plan to have start-up grants for academic staff to develop e-learning materials and strategies?

- What is the amortisation plan for capital costs?

- Are there plans to cater for a rapid escalation in student and staff users (e.g., additional servers and support)?

- Are there comprehensive and costed IT back-up plans in case of failure?

Massey University ("Devolution of Control") provides an example of an institution endeavouring to resource its e-learning development on a fully devolved funding model. Otago University and AUT University are examples of competitive grant systems delivering modest support for selected programmes. NorthTec and Otago Polytechnic are examples of larger-scale central investment in e-learning on a targeted basis.

5. Collaboration

5.1. Why collaborate?

There are several reasons why an institution might collaborate with another entity to support its e-learning programme. These would include:

- to gain access to specialist expertise, knowledge, systems, courseware, networks or hardware concerning e-learning that is owned by, or accessible to, the partner organisation(s);

  This raises the important strategic question of where an institution strikes the balance between developing all the resources and systems required to support its e-learning programmes or contracting outside agencies to deliver some of these services. Where this balance is struck will depend on questions of size, history, strategic focus and organisational culture. Smaller institutions and those newer to e-learning may find it advantageous to contract out the supply of many of these services rather than make an expensive and long-term commitment to developing the whole array of services required to develop and deliver high-quality e-learning. An institution placing a strategic focus on e-learning might consider it desirable to develop more in-house capacity than one with a lesser commitment. An institution with a relatively

centralised approach to programme development may also find it easier to incorporate a suite of programmes and services developed by an outside agency rather than one with a more devolved and teacher-centric structure and culture.

Another approach that institutional leaders might usefully take would be to ask which of these services relate directly to our core business?

Another question is whether an institution plans to make short-term use of contracted services, buying time while it develops its in-house capability to deliver these services.

- to expand the visibility and market reach of an institution's teaching programme by collaborating with institutions offering complementary programmes;

Ideally, this is a powerful reason for collaborating with another institution. It is clearly advantageous if institutions can combine their individual specialty subjects to support a broad-based programme which is then offered to a large student market. The advantages are only achieved, however, if collaborating institutions continue to acknowledge the contribution of each party and are not tempted to duplicate the offerings of their partners. Over the past couple of decades, there have been a number of collaborations that have fallen apart as one or more partners have moved from a collaborative to a competitive stance.

- to widen the effective catchment of an institution by collaborating with an institution that can offer local support services to students in its region;

Most educational delivery modes require some form of local support for students. While an institution may be able to deliver its courseware to students online, it may have more difficulty providing other services – such as ongoing tuition, library support or examination facilities for example – by this medium. Most institutions will find it more cost-effective to provide these regionally based services through a network of collaborative arrangements with regional institutions and organisations rather than attempting to establish their own regional networks.

Institutions that are asked to provide these kinds of regional support services on behalf of another provider need to be satisfied that these arrangements are compatible with their own strategic objectives, that the full cost of these services is being met and that there is a reasonable level of reciprocity in such relationships.

- to achieve economies of scale by increasing the size of the student market and the institutions' combined capacity to meet this market;

Developing, delivering and supporting quality e-learning is a capital-intensive activity. This may provide an incentive for institutions to collaborate to secure a larger combined student market for a programme than any of them could hope to achieve unilaterally. This begs the question of how the partners work together to deliver a combined programme, how they contribute to the costs and divide the revenue, and how they 'brand' the programme.

- to comply with an external policy, regulatory or funding requirement for such collaboration;

The policy and funding environment in force at any particular time will exercise a major influence over an institution's commitment to collaboration. During the era of exclusively EFTS-based funding, institutions were strongly encouraged to compete with one another for market share. Continued growth, both in numbers of students and breadth of programmes, was a powerful institutional imperative. The recent change of government policy, in favour of planned provision and targeted public investment in that provision, must act as an important driver in institutional attitudes towards collaboration. Hopefully, opportunities to collaborate will still be analysed against the four factors listed above. However, this analysis will need to be tempered by a recognition that government policy has now changed. Simply expanding student enrolments may not lead to increased revenue; some institutions – and ITPs in particular – are being actively discouraged from enrolling students from outside their regional catchments; and increasingly, funding and government support will be conditional on a wider range of outcome and quality measures than are currently in force.

TANZ is a collaboration among six medium-sized regional polytechnics. Right from its outset, TANZ has seen greatest scope for collaboration among its member institutions in the planning, development and provision of e-learning programmes and services. Early success has been achieved in offering joint programmes in applied business; plans are underway for larger-scale collaborative offerings.

5.2. Why outsource e-learning services?

This question is not peculiar to e-learning. During the past two decades or so, as the drives for efficiency and effectiveness have heightened, managers of tertiary institutions have asked it of many of their services. Campus security, catering, student accommodation, transport, grounds maintenance and book supply are just a few of the more obvious candidates for supply through commercial contracts. In these cases, judgements have usually been made on the basis of non-core business activities and efficiency. Institutions then endeavour to ensure continuity and quality of service provision through a process of vigilant contract management.

The growing complexity of tertiary education has encouraged institutions to expand this process of outsourcing into key support systems such as student, programme and IT management systems. Increasingly, institutions employ commercial agencies to assist with staff recruitment, design and corporate branding, and aspects of staff development. A similar, growing complexity in the delivery of core teaching services has now encouraged many institutions to outsource some aspects of this work. There are now commercial agencies ready to provide a full array of services to support e-learning and other media-intensive teaching modes. To quote the list of services available from one leading New Zealand company, these could include any or all of the following:

- professional development;

- instructional design;

- courseware development;

- quality assurance;

- specialist technology;

- hosting and intellectual property security;

- distribution and support;

- marketing and media.

Why would an institution opt to contract in any of these services from a commercial agency rather than develop this capacity in-house? The reasons will be fairly similar to those applying to a decision to collaborate with another provider or group of providers:

- Contracting with an outside agency may allow an institution to embark on e-learning in a matter of months and much earlier than would be possible if it were to build its own capacity to deliver these services. An experienced commercial agency should be in a position to deliver a specified level of service and according to a contracted timetable.

  The key question institutional leaders need to resolve fairly early in this process is how they envisage this contractual relationship will change over the coming years. Do they intend to continue to contract this same level of service in the years ahead or do they plan to develop some or all of these services on an in-house basis in the future? A commercial agency should be able to operate under either scenario but it will be in the interests of both parties to clarify this question at the time the original contract is negotiated.

- Contracting with an outside agency may allow an institution to gain access to expensive and complex systems, and to highly specialised expertise that it

would find difficulty in developing or resourcing itself either immediately or even over the next few years.

e-Learning involves a fast-developing set of applications that employs an even faster developing array of technology. Institutions wishing to stay in front of this technology will find it necessary to invest heavily in technology upgrades and specialist recruitment. This challenge may be hard to meet in the face of the competing demands for funding within a tertiary institution. Depending on the scale of operation that is envisaged, it will often make better economic and strategic sense for an institution to develop an ongoing commercial relationship with an agency that is solely committed to this challenge.

The argument for out-sourcing will be particularly strong where the service is especially capital-intensive or the institution's use of the service is relatively infrequent, such as the development of high-end multimedia courseware. The argument may be somewhat weaker where the contracted service could be seen to be a part of core business for a teaching institution, such as interacting with students in either a teaching or a pastoral capacity.

- Contracting with an outside agency may allow an institution to plan, resource and manage its commitment to e-learning with more confidence than would a commitment to a home-grown solution.

  A contract with an outside agency will specify the service to be provided, the quality to be achieved, the delivery deadlines and the price as well as addressing contingencies that might affect any aspect of the contracted deliverables. The development can therefore be planned for and budgeted with a reasonable level of confidence. The contracting agency will be highly motivated to meet its contracted obligations and the institution should be able to manage its risk with some confidence.

- Contracting out can sometimes be the best way of addressing a new market opportunity that falls outside the normal business or operating methods of existing teaching units. It is interesting to note that some of the more successful contracting ventures of New Zealand tertiary institutions have been instances of this kind. This happens where an institution recognises that there is a much larger market for some aspects of its programmes or expertise but that existing structures of academic and programme management don't lend themselves readily to expanding to meet this market. A contractual relationship with an outside agency, coupled perhaps with a dedicated in-house business unit, can sometimes allow the institution to take advantage of that market opportunity without distorting or over-extending the work of the core teaching units.

Institutional leaders should be conscious of the limitations or drawbacks of out-sourcing:

- Cost will be a consideration though probably not the major one. An agency offering high-end development and support services for e-learning will be employing staff at generally a higher rate of remuneration than the institution would to deliver a similar service. The agency will be carrying a significant commercial risk and its fee structure will reflect this. These factors may suggest that institutions may want to use such agencies selectively to deliver those services that they are currently unable to provide or to assist them in the initial phases of a commitment to e-learning.

- There is a danger that a client institution will become locked into a contractual relationship that over time may become less appropriate or affordable. The contract may specify, for instance, that all learning resources are produced using the contractor's proprietary software or hardware. This is likely to make it both difficult and expensive for the client to abandon the relationship even though more appropriate solutions may be available in the market over the course of time.

- Outsourcing a service is likely to reduce the need or the motivation for the client to develop its own capacity to provide this service unless this development is clearly anticipated in the contractual agreement and in the institution's ongoing planning and investment in this area.

- A close and exclusive contractual relationship with an outside contractor may make it difficult for the institution to consider new relationships and new possibilities in its use of e-learning technology.

For a number of years, Waikato Institute of Technology (Wintec) has contracted Intuto to deliver a range of e-learning services and products on its behalf. The relationship allowed Wintec to take advantage of a market opening that it would not have been able to service on its own. It is a commercial relationship that undergoes constant change as the nature of the service mix changes.

6. Staff development, instructional design and course development

6.1. What sort of expertise and training do teachers need for e-learning?

This begs the more fundamental question of what sort of pedagogical skill and knowledge do teachers need for any form of teaching at a tertiary level. There is a range of views on this from those who believe that tertiary teachers need professional preparation at least equivalent to that provided for graduates wishing to enter secondary school teaching (that is, a full-year equivalent of training in addition to their qualification in their teaching subject) to those who believe that a well-qualified subject specialist will pick up the essentials of teaching without a great deal of explicit instruction in the craft. Most parts of the tertiary sector fall somewhere between these extremes and favour a combination of point-of-entry and continuing

training for tertiary teachers. Typically, this training is provided by in-house staff development units, though there are several approved qualifications available of varying duration.

While not questioning the value of any of these programmes, it is worth noting that the international research evidence for the value of such training – in terms of any measurable impact on student learning – is hard to find. More significantly, the research suggests some other forms of training and support that are no less valuable than formal training in pedagogy. These include work-based training where the unit leader or an outside agent takes an active role in developing the skills and competence of all staff during the course of their regular activities; mentoring, where colleagues work closely with another teacher especially during their early years on the job; and using the systematic feedback that most institutions gather from students about their course experience in regular performance discussions between supervisors and teachers. These are all strategies that institutions can employ to improve the quality of their teaching.

If we are to look at the attributes of effective online teaching and learning, we would find that most writers on the subject suggest they are nearly identical to those for conventional modes of teaching. Marshall (2005-8), for instance, draws on the familiar "seven principles for good practice in undergraduate education", first articulated by Chickering and Gamsun (1987) several years before the existence of the Internet. These principles are:

- encouraging contact between students and teachers;
- developing reciprocity and cooperation among students;
- encouraging active learning;
- giving prompt feedback;
- emphasising time on task;
- communicating high expectations;
- respecting diverse talents and ways of learning.

This is not to minimise the importance of good teaching practice in e-learning, simply to point out that the principles of good teaching appear to be the same whatever the study mode.

If these generic teaching skills and knowledge can be taken for granted, or at least addressed as part of the normal preparation programme for any tertiary-level teacher, what are the distinctive competencies that e-learning is likely to require of teachers? Most analyses suggest a fairly technical set of skills rather than any new and challenging pedagogic principles and processes. These include:

- working with members of a production team (where this is the model in operation – see above) to create online learning resources;

- instructional design skills sufficient to the task of developing a set of online teaching resources (where a production team approach is not in place);

- a level of computer literacy adequate to the task of developing and/or managing a programme delivered via a LMS;

- knowledge of external electronic resources;

- managing email and other electronic discussions both synchronous and asynchronous;

- working with students at a distance.

(after Butterfield et al, 1999, p.15)

With some exceptions, these are technical skills and knowledge that can be acquired fairly rapidly. Many of them will be particular to the approach to e-learning that is being used in a given programme rather that applying equally well to any mix of approaches. Arguably, many of these skills would be acquired most readily through mentoring relationships as teachers developed their first online course.

6.2. Does your institution have the capacity to train its teaching staff to develop and teach with e-learning media?

Strategically, almost all TEOs have some form of staff development. The character of the development remains somewhat contested according to the level of the institution. For example, some larger units focus on exploring staff development from an intellectual perspective, while others are more service-oriented. In general, the aim of the units is to provide staff with the necessary knowledge and skills to be able to perform an efficient and effective teaching function in pursuit of the institution's goals. Many in the academic development community would argue that progress is impeded by the absence of a qualifications framework for staff development indicating a required, minimum teaching performance standard for the sector.

In principle, it would be expected that staff development units are service bodies providing support to all institutional staff. On the academic side, working with staff to clarify learning objectives, providing advice on a variety of teaching strategies, considering and advising about assessment and evaluation and often monitoring and advising on the role of extant or emerging technologies as they might affect the academic purpose of the institution. Some university-based staff development units conduct research into different aspects of tertiary learning and teaching. On the non-academic side, issues of competence and skills, human resources management and related matters sometimes engage staff development units.

The strategic issue for e-learning becomes the extent to which the personnel in the staff development unit have the skills and knowledge necessary to up-skill teaching staff in the particular requirements of e-learning. Some institutions find themselves in a position to hire in the required personnel while others may choose to rely on the skills and knowledge of existing staff. Providing assistance to staff to use e- learning strategies involves capacity in the following areas:

- revising and redesigning curriculum philosophies, design and practices;

- reconceptualising teaching strategies where e-learning is to be involved;

- reconsidering assessment strategies and timing to make use of digital technologies and secure student identification systems; and

- choosing the most appropriate technologies to enhance the teaching strategies.

It is assumed that staff development units will be a limited institutional resource. Such units may need to identify strategies to ensure that access to them is based on a rational assessment of requests, perhaps linked to the institutional strategic direction, especially if it involves a move towards blended or e-learning. It is at this level that the strategic role of staff development units becomes important because they are often the conduit between the institutional strategic directional statements and the actual practices used in faculties, schools and by individual academics. Staff development units supportive of, competent in and knowledgeable about e-learning are more likely to achieve the institutional e-learning goals than those that do not have those characteristics.

6.3. What sort of IT support will teachers need?

Most institutions recognise that teaching staff will require at least a basic training in any online LMS. This will commonly take the form of short training courses where teachers are brought together into a computer lab and stepped through the basic functions of the LMS by a trainer. The latter is likely to come from the unit responsible for managing the LMS – either the academic development/staff training section or sometimes the IT section. Many institutions will place some requirement on staff to undertake this kind of training before they embark on their online teaching.

A second form of support will be the appointment of IT support people at a 'local' level. Depending on the size of the institution, these appointments might be made at a faculty or even programme level in larger institutions or perhaps at a campus level in smaller institutions. They will be available to assist staff in maintaining and managing their online programmes and helping them to resolve technical difficulties as they occur. Some of these 'local' appointments combine the IT support role with an instructional development role. This is a particularly valuable combination where it can be achieved as teaching staff can get immediate, comprehensive assistance, not

just with their technical difficulties but as they plan and develop their online courses in the first place.

A third form of support will likely come from the IT section itself by way of a helpdesk service. This is an indispensable service in terms of ensuring that teachers are able to operate within a secure, network environment, but it is not likely to be able to offer the level of support and customer service of the 'local' support person. Where possible, an institution should maintain both levels of support.

Two other support resources should also be considered. The first is online training. Most software packages come with fairly comprehensive online training programmes. Institutions need to be aware of these packages and encourage teaching staff to use them at least as a first response to a problem. The second involves a teacher's colleagues. Staff in a department or faculty are likely to be at different levels of skill and experience in e-learning. Most should not mind offering occasional advice and assistance to help a colleague master a particular skill or technique in designing or managing an e-learning course.

One final observation on the subject of IT support needs to be made. Teachers will need more than an elementary familiarity with computers before they can be expected to teach using this medium. In the modern environment, we tend to assume that familiarity with the Internet, with email and with common office software such as spreadsheets, PowerPoint and word-processing is almost universal. In many educational communities, this assumption may be an unrealistic one. If teachers are not fairly sophisticated in their use of email, they are likely to have difficulty supporting an online discussion group process. If they are not equally experienced in their use of word-processing, they will have similar difficulty building a set of resource materials within an LMS. If they don't really understand the principles of file management, they will likely get themselves in a hopeless muddle. Worse still, if they do not have word-processing skills, teaching in a web-based course will be a nightmare for all concerned. These are all skills that can be learned but probably not in the very short term. Where an institution is drawing on a group of tutors who do not come with a long tradition of computer-based experience, they need to be careful about imposing unrealistic expectations for their use of e-learning.

6.4. What sort of guidelines should influence the development and delivery of courses taught or supported by e-learning?

This is a huge and complex question. It begs a number of related questions. For example, what is the intended student market? What is the intended mix of teaching processes? What are the learning objectives? What are our constraints in terms of resources and infrastructure? The answers to these latter questions are likely to vary across the divisions and programmes of the institution. However, this variety of responses should not discourage an institution from tackling the issue.

The question of what is "'fit for purpose", where teaching and learning are being transformed, carries with it a baseline assumption that the standard face-to-face teaching model is the most fit for achieving the learning outcomes sought by TEOs. It is historically the most common and is based on the paradigm of teaching involving the co-location in space and time of a group of students, a teacher and appropriate resources. Quality measures are those agreed to by the relevant Quality Assurance body such as the Institutes of Technology and Polytechnics Quality (ITPQ)or the Committee on University Academic Programmes (CUAP). Both bodies use proxies as measures of quality including, for example, number of staff with certain levels of qualification, student-teacher ratio and books held in the library etc. An institution might ask itself if it wishes to adopt a separate set of quality measures for e-learning, as is and has been done in the distance education context, or use those designed for the face-to-face teaching context.

Using technologies for teaching suggests that institutional quality assurance models might adopt different pathways. The first is to assure the quality of the work being done in the new way as a separate entity and apply standards particular to the model. This strategy might leave the dominant paradigm of teaching unexamined because it tends to assure inputs over outcomes. A number of institutions use a system of benchmarks to compare themselves either against the published benchmark standard or against the performance of another institution having similar characteristics, staff and student bodies or goals and aspirations. In New Zealand, there are three benchmarks regimes that institutions might consider.

As mentioned above, the New Zealand e-Learning Guidelines are an online resource enabling a range of questions to be posed and answered with extensive references to current literature. The e-Learning guidelines are 'wiki' based and allow additions to be made on a continuous basis to ensure that current literature practice and thinking are maintained, whether from New Zealand or elsewhere (elg.massey.ac.nz).

Another New Zealand-based benchmark is the e-Learning Maturity Model (eMM). Capability is perhaps the most important concept incorporated in the eMM. Capability, in the context of this model, refers to 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. Given the large investments made in e-learning both by students and institutions, it is essential that delivery be robust and reliable, and able to cope with changes in the personnel involved, growth in the number of students, changes in technology requirements and skills, as well as the increasingly challenging digital communications environment. The assessment of capability in a complex area such as e-learning is difficult. It necessarily involves reducing large amounts of detail into a broader overview that supports management decision-making and strategic planning. Inevitably, this approach will fail to single out the

subtle nuances and innovative work of individuals that motivate teaching staff to work on individual projects. Institutions and individuals will always have the ability to choose to invest time and other discretionary resources in innovative, unique opportunities.

In particular the eMM benchmarks examine the following areas of performance:

- learning;
- development;
- co-ordination and support;
- evaluation;
- organisation.

Each topic area is further subdivided into many other mappable subsets.

Further information about the eMM may be found at the following site: http://www.utdc.vuw.ac.nz/research/emm/

In the USA, the National Education Association (the USA's largest professional association of higher education faculty) and Blackboard Inc (a widely used platform provider for online education) are interested in exploring benchmarks and their implications. They asked the Institute for Higher Education Policy (IHEP) to attempt to validate benchmarks published by various entities, with specific attention to Internet-based distance education.

This study is designed to ascertain the *extent to which the benchmarks are actually incorporated* in the policies, procedures and practices of colleges and universities that are distance education leaders. In addition, this study seeks to determine *how important* these benchmarks are to the institutions' faculty, administrators and students.

IHEP first reviewed all existing principles, guidelines and benchmarks that address best practices in distributed learning and combined them into a list of 45. The researchers tested the efficacy of that list by asking academic staff, students and administrators (n=147) at six institutions about 1) to what extent is the benchmark true for the distance learning programme (s), and 2) how important is each benchmark to ensure quality?

The topic areas include:

- institutional support;
- course development;
- teaching and learning;

- course structure;

- student support;

- faculty support;

- evaluation and assessment.

For further information about this IHEP study see the following site:
http://www.ihep.org/Publications/publications-detail.cfm?id=69

In Australia, the Australasian Council on Open, Distance and e- Learning (ACODE) developed the following benchmarks. The purpose of the benchmarks is to support continuous quality improvement in e-learning. The approach reflects an enterprise perspective, integrating the key issue of pedagogy with institutional dimensions such as planning, staff development and infrastructure provision. The benchmarks have been developed for use at the enterprise level or by the organisational areas responsible for the provision of leadership and services in this area. They have been piloted in universities and independently reviewed.

Each benchmark area is discrete and can be used alone or in combination with others. Benchmarks can be used for self-assessment purposes in one or several areas, or as part of a collaborative benchmarking exercise.

The benchmarks cover the following eight separate topic areas and have been internationally reviewed:

- institution policy and governance for technology-supported learning and teaching;

- planning for, and quality improvement of, the integration of technologies for learning and teaching;

- information technology infrastructure to support learning and teaching;

- pedagogical application of information and communication technology;

- professional/staff development for the effective use of technologies for learning and teaching;

- staff support for the use of technologies for learning and teaching;

- student training for the effective use of technologies for learning;

- student support for the use of technologies for learning.

For more information on the ACODE benchmarks for the use of technology in learning and teaching refer to the following site:
http://www.acode.edu.au/aboutus/acodebenchmkwksp/default.htm

At the strategic level, an institution might wish to consider incorporating an appropriate benchmarking regime early in its adoption of e-learning so that it might monitor its progress *ab initio* and make adjustments to performance as necessary. This would be particularly important in the case of an institution including e-learning elements in its investment strategy as reported to the TEC and consequently having a system for measuring if the strategy is succeeding.

Earlier in this discussion, the case was made for key decisions about e-learning to be taken at least at the level of programme leadership if not at a divisional or whole-of-institution level. The case was made on grounds of strategic focus, programme coherence, quality assurance, student support and management of resources.

The development and application of e-learning within a teaching programme should be guided by a set of statements that:

- identifies the target student market for the programme;
- outlines a teaching and learning plan to engage this market;
- provides a timeline for developing and implementing this plan;
- identifies the resources and support services that will be available to assist staff and students in the development and delivery of the programme.

The length and extent of such statements will vary and may be best understood by reference to one or two cases. The key criteria that need to be satisfied are: do the statements provide adequate guidance to staff on what is expected of their online teaching, and do they allow some assessment of the extent to which the guidelines are being met?

6.5. What systems and processes are in place for the planning, preparation and production of study materials? What systems are in place for monitoring the quality of study materials, including their periodic review and redevelopment?

Effective e-learning is heavily dependent on the timely availability of well-designed teaching and learning resources. This apparently obvious statement is in some contrast to conventional classroom teaching where planning, preparation and teaching often take place in a rolling sequence throughout the duration of a course.

If the institution has chosen a production team approach to course preparation, it is likely that these processes will be planned very thoroughly. An institutional leader responsible for e-learning should expect to see very strong, well-documented project management processes in place for the development of online learning resources. These documents should indicate the contribution each member of a production team should make, when it needs to be made, how each contribution articulates with the remainder and how it will be resourced. They should also clarify the leadership of

the project and the communication processes among the team. Senior managers need to be aware of critical deadlines that need to be met and to understand the steps that must be taken if these deadlines are not met.

If the institution has opted for a more teacher-centric approach, it is possible that the need for such systems will be overlooked or underestimated. This will expose the institution to the risk that some online courses will fail to be ready or fail to reach an acceptable standard by the time that students need to start their study. Institutional leaders need to take steps to minimise this risk. Such systems will vary depending on the individual institution and the programme in question but they should all meet the following characteristics:

- Systems should be in place for identifying upcoming courses that contain an e-learning component and for communicating this information to the teachers/developers concerned, to the programme leader, to central service providers (such as the LMS manager, the library, student support service etc) and to the instructional development support unit that is likely to be asked to provide assistance.

- Any staff member responsible for developing and teaching online should have the requisite skills and knowledge to prepare study materials and teach in this medium.

- The level, nature and amount of assistance and advice that will be available from instructional development staff and other specialist staff should be indicated at the outset but with the expectation that some teacher/developers may need considerably more assistance than others.

- A timeline for the planning, preparation and production of resources should be negotiated with the teacher/developer and performance monitored against this timeline and against any recognised quality standards.

- Someone should be given the responsibility of monitoring the development of each course, providing feedback to the teacher/developer at appropriate points in the process and alerting the programme director to any risk of failure to complete the work on time and to a satisfactory standard. An instructional developer – either at a central or programme level – will usually fill this role, though a teaching colleague could do so instead.

- Explicit recognition should be given for the time teachers need to prepare their online course materials.

6.6. What policies and systems are in place to ensure the uptake of e-learning by teaching staff?

This is a highly topical question. The recently completed Final Report of the Evaluation of the e-Learning Collaborative Development Fund (May 2007) conceded that e-learning is still the domain of the 'early adopters' in most tertiary institutions in

New Zealand. They attributed this lag, in large part, to the lack of competence or confidence of most of their colleagues to teach in this medium.

There is undoubtedly a lot of force to this argument. Just as institutions are building capability in infrastructure and management systems to support e-learning, they also need to build the capability of their staff to teach in this medium. However, an increased investment in staff training and development is unlikely to be sufficient to achieve the quantum increase in uptake of e-learning to which many institutions aspire.

Institutions wishing to make faster progress in terms of e-learning uptake generally find it necessary to introduce policies that will drive rather than simply enable this uptake. These policies will vary in detail but they are all likely to define the matter in institutional or collective terms rather than as one driven exclusively by individual preference or choice. The following are just a few of the measures that some New Zealand institutions have adopted to ensure a steady uptake of e-learning:

- There is a clear and targeted endorsement of e-learning in the institution's strategic documents. The documents make it clear how, why and when e-learning will be used and just as importantly, where it will not be used.

- Decisions about teaching mode are made at a divisional or departmental level on behalf of an entire teaching programme and not left only to the discretion of individual teachers.

- Programme leaders accept responsibility for managing the implementation of e-learning across the selected qualifications.

- Introduction of e-learning within a programme is planned and implemented in a carefully phased way.

- There is a realistic and transparent resourcing of the planning and development phase of the implementation.

- Programme teams work within an agreed set of standards to ensure that all courses meet at least minimal standards for the development, delivery and support of their e-learning.

- Staff training for e-learning is designed and managed around the work of the programme teaching team as they plan, develop and implement their new e-learning programme.

- Members of a teaching team receive the training and support they need to adapt to this new teaching medium.

- Teachers are actively supported in this transition by specialist staff and by ongoing monitoring by the programme leader.

- A programme-based quality management system is in place.

These conditions may be too demanding for some programme teams. Shifting from conventional teaching to e-learning does represent a significant change in professional practice and some teachers may find it altogether too challenging. Divisional and programme leaders need to assess the readiness of their staff before committing to this shift. A small number of reluctant staff may be managed through targeted assistance or redeployment to other duties. But a significant group of reluctant adopters may warrant a reconsideration of any plan to introduce e-learning into a programme.

7. Teaching and learning

7.1. What is the institutional (faculty, programme) vision for teaching and learning, and how does e-learning support this vision? Are you confident that this vision is shared by your teachers and students?

This is another take on the question: if e-learning is the answer, what was the question? Another more convoluted way of asking the question might be: how will e-learning enhance your teaching in ways that you are currently unable to achieve in a cost-effective way through conventional means?

e-Learning technology offers a number of learning and communications tools to educators. Their interest in and use of these tools is likely to vary depending on the particular challenges they face in teaching their subject, or their student body. It is important that there is a high-level understanding about how a particular e-learning solution will address a specific subject or target student group. A listing of some of the commonly available functionality of e-learning LMS will illustrate this point:

e-Learning LMS:

- allow students to access course-specific learning materials when they need them and wherever they happen to be;
- allow teachers and students to communicate both synchronously and asynchronously, bilaterally and multilaterally, in ways that are not always possible in large classroom situations and that are seldom possible in conventional correspondence study;
- allow students to simulate clinical and work-based experience through simulation software and sophisticated multimedia packages;
- allow teachers and students the option of paced or self-paced study;
- allow students to check their learning progress through automated learning programmes and quizzes;

- allow students to extend their learning experience beyond the institutional boundaries to draw on the resources of the Internet or of collaborating institutions and individuals.

8. Student support

When institutions commit to communicating with students online, they take on a concomitant commitment to ensure that these online channels are accessible, robust, user-friendly, authoritative and comprehensive.

8.1. What support do students need for online study?

Students can only study effectively online if they can access their online study environment, know how to navigate within that environment, are competent users of the necessary software and information systems, are informed about any policies about their online study and have access to prompt advice and assistance when they encounter difficulties with this environment.

These needs are generally best met by dedicated, institution-level service agencies rather than by individual teachers or even by programme units. In this way, the institution can ensure that there are robust, reliable and cost-effective systems in place to ensure that students are able to study online. If this seems a statement of the obvious, one only has to recall the very recent past as the first generation of 'early adopters' enthusiastically committed their classes of students to their home-grown e-learning programmes. Very quickly these teachers realised that the burden of fielding frantic telephone calls from students about establishing and maintaining a connection with the online teaching environment was not one they felt willing or sometimes even competent to handle. These early adopters were in the vanguard of the call to institutions to provide some more generic support for students studying online.

These services will commonly include the following:

8.1.1. A helpdesk service

Institutions with a significant e-learning programme are likely to find it necessary to set up some kind of helpdesk service. Their job will be to respond to service and information queries from student users. If the institution already possesses a general help desk, it may be possible to add this task of meeting frontline student queries about e-learning to their other duties. This has the advantage of economy and ease of access. Students have a single point of contact with the institution for any query about their relationship with the institution and a duplication, and possible confusion, of points of advice is avoided. However, this solution will only be effective if there are very clear guidelines about the issues the helpdesk can and cannot assist with, and how it handles the latter cases. It is a solution that also calls for thorough and continuous training and monitoring of helpdesk staff.

Alternatively, an institution may choose to establish a more specialised helpdesk function within its IT service or attached to the student computer laboratories. These two services are likely to have staff with the required expertise to address most of the connectivity, hardware and software issues that students may confront. They are also likely to be the point of contact for any queries that the institutional helpdesk is unable to resolve.

Service levels will be the subject of recurring attention for an e-learning helpdesk service wherever it is located within the organisation. There will be calls to extend the hours of this service beyond normal business hours and into the evenings and weekends. A judgement will need to be made in this respect about the institution's commitment to supporting genuinely flexible learning. Likewise, standards will need to be set concerning speed of response – whether an immediate, same-day or next-day response is acceptable for various types of queries, particularly when the query may come by email. Institutions supporting large numbers of learners will encounter huge fluctuations of usage through the day, across a week and over a year. They will probably need a flexible staffing policy to manage these fluctuations.

8.1.2. Access to information about the online learning service

A helpdesk should not be the only or even the first support service available to students. Institutions will quickly find that they need to provide accessible advice to their students on a range of online services. These could include advice on:

- access to a student information system;
- access to an e-learning system;
- access to library resources online: eLibrary;
- allowed systems passwords;
- student email system: WebMail;
- contacting the IT service desk;
- getting access to their files remotely: MyFiles;
- registering for an Internet account;
- student email: WebMail.

The helpdesk can also pre-empt a lot of repeat queries by posting or publishing answers to frequently asked questions of the following kind:

- How do I manage email SPAM filters?
- How can I access my files from home?
- How much does it cost for CD burning/printing/scanning?
- How much space do I get on the network?

- I am trying to print but nothing is happening?

- I have an Internet account, but my WebMail isn't working?

- I need to type in a Word doc that I've downloaded but can't?

- What's my username/login?

- How can I put credit on my printing or Internet?

Students also need access to information on any key policies and regulations affecting their use of the online learning environment. These may concern the use of the institutional Internet and intranet, email use, copyright, plagiarism and guidelines for computer laboratory use.

All this information should be posted prominently on the institutional website but an abbreviated version should also be distributed to students in print form.

8.1.3. Access to software

Most academic institutions require students to prepare assignments in an electronic form and to make use of software packages in various learning exercises. They will generally arrange site licences for given software packages. Students need to be able to access this software in a secure and authenticated environment.

8.1.4. Training

Many institutions provide some sort of training to help students to make best advantage of their online study. These could consist of self-training online courses on various software packages or an online 'primer' on using the LMS itself. Some institutions have taken their training support a step further and put some of their generic student learning support online. (e.g., see http://owll.massey.ac.nz/)

8.2. Does the institution collect information about student access, knowledge and competence concerning e-learning?

The provision of support services should be based on well-researched knowledge about student needs. First and foremost, institutions should have a good idea of the level of Internet access enjoyed by their students before requiring them to study by that medium and also before they continue to invest in expensive computer laboratories or radio network systems. A very high proportion of New Zealand homes and workplaces now have Internet access so email communication can generally be taken for granted. But, with uptake of broadband access still lagging, requirement for heavy use of the Internet for home-based study may remain a challenge for some. Conversely, the ownership of laptop and tablet computers is now so high in some student groups that continued institutional investment in computer laboratories may not be a sound decision. Without data on student access, institutions are unlikely to make optimum decisions.

Likewise, institutions need to know something about the IT capabilities of their students before continuing to invest in training students in these skills. An example from AUT University will illustrate this point.

AUT University students were surveyed on their confidence and competence in using the institution's e-learning platform AUTonline. Respondents were asked to indicate if they felt that their own IT capabilities were limiting the extent of their AUTonline use. The majority of students (71%) did not think their use of AUTonline was limited because their IT skills were lacking. However, 12% did think that this was the case and this proportion was higher amongst those aged 40 and over (25%), those from the Faculty of Applied Humanities (23%) and those aged 30-39 (21%). More than half of the survey respondents (56%) felt that it was easy to download files from AUTonline, 38% thought it was moderately easy and 5% had trouble downloading files. The sub-groups that appeared to have the most trouble downloading files from AUTonline were New Zealand Maori students, students aged 30 and above and part-time students, where one in ten said they found it difficult to download files. The results show a marked difference in ease of downloads between the Faculties of Applied Humanities and Business and those in Design and Creative Technologies and Health and Environmental Science. This matter warrants more investigation into the type of files being handled, in terms of staff training, or perhaps in terms of required bandwidth.

The data demonstrate that while students were fairly competent with their IT skills, there were particular groups of students and particular online functions that needed more attention.

8.3. What systems and standards are in place to ensure that students studying by the e-learning medium obtain adequate access to the range of support services available to campus-based students?

LMS are focused on teaching, learning and assessment. They may also provide links to other available online services. They are not likely to provide students with the array of informational, administrative and pastoral support services that they would normally receive as part of a campus-based study experience. Institutions need to ensure that e-learning students have adequate access to these various services. In the case of campus-based students, or students whose study involves them making regular visits to the campus, institutions might reasonably require them to access these services via the normal, face-to-face means. Often, a CMS, linked to a LMS, can provide students with vital and timely administrative information related to their courses.

So, for example, students could continue to visit the dean to obtain their course advice, complete their enrolment processes by queuing on campus, access the library through its front door, submit and collect their assignments by hand, pay their

fees and fines at the cashier's office, attend study skills courses on campus and sit their final exams in a campus-based exam room. Institutional leaders need to be alert to the service gaps that are likely to open up as their colleagues commit more intensively to e-learning, particularly by off-campus students. A distance student who enrols with a remote institution for an e-learning course cannot reasonably be required to access any of the foregoing services by visiting the campus. In many cases, these gaps can be closed by the appropriate use of print-and-post, telecommunications and a commitment by campus-based services providers to respond to emailed service requests. However, this will only happen if the support needs of these e-learning students is kept to the fore and the various service providers are regularly reminded of their obligations towards this group.

8.4. What level of commitment and progress has the institution made to extending its online services beyond e-learning to allow students to access more of their administrative, informational and support services online?

The previous section identified the very limited ability of a standard LMS to provide students with the full range of administrative, informational and pastoral support services they need and are entitled to. It identified 'work-around' solutions that can be employed involving print, post and telecommunications. Many institutions are recognising that these solutions are less than ideal. Increasingly, institutions are attempting to make more of their services, if not all of them, available to students online. This would mean that students undertaking study primarily online could also:

- study their upcoming course options and seek clarification and advice online;

- apply for enrolment and register for their courses online;

- pay all tuition and other fees online;

- access orientation and study skills support online;

- interrogate their current and historic record of enrolment online;

- submit all their assignment work online through a secure system that ensures receipt and return of all work, that maintains the authoritative record of student achievement and that allows auditing of marking performance; and

- undertake library searches online and access available digital resources.

Providing these support services online will not be a trivial exercise for an institution. In fact, it will require the re-engineering of many of the institution's core administrative processes. For most institutions, this level of investment will not be justified simply to support a minority of students. The argument may need to be made on the basis of the efficiency and effectiveness of the institution's entire service operations.

At the core of this issue is the question of how the LMS articulates with the institution's SMS and its course-offering database. Most institutions now have reasonably robust SMS and course-offering databases – the compliance requirements of their funders require it, if for no other reason. The problem arises in ensuring that the records of students and courses registered on most LMS are seamlessly articulated with their corresponding institutional SMS and course-offering databases. Some LMS provide more readily for this than others and it will depend on the specifications of the institutional systems. This is a key issue for institutional leaders to watch. If the articulation issue is not resolved, the management of student records will devolve to individual online teachers requiring periodic, error-prone, batch uploads to the central service. This is therefore a key consideration in choosing and then maintaining an institutional LMS and a CMS.

> The second Massey University case study, "Developing an Online Infrastructure", shows the level of investment that can be required to bring an institution's infrastructure to the level where it can fully support on online study environment.

9. Assessment and moderation

The assessment and moderation of student work in an e-learning environment generally follows similar principles and processes to those of conventional education. Assignment work is submitted electronically or by conventional mail; quizzes are available to provide summative or formative assessment during the course; students are able to complete examinations either face-to-face or online; and examples of student work and assessments can be sampled and moderated by peers in the normal way.

9.1. What are the key issues that institutional leaders need to be aware of with respect to online assessment and moderation?

There are probably just two or three issues on which senior institutional leadership need to take an active guiding hand in this area.

9.1.1. The submission, recording and tracking of assignment work

One of the challenging features of e-learning is maintaining an authoritative record of the flow of student assignment work between students and markers, and then back again to students. The challenge is to relieve the individual markers of the entire responsibility for managing this process and for maintaining a definitive record of student achievement. With conventional teaching, programme units tend to operate some sort of central bureau for the submission, recording and forwarding of assignments, especially for courses with very large enrolments. Institutions with distance students studying by correspondence tend to insist that all student assignment work is submitted and returned through a single bureau which keeps a record of this traffic along with a record of grades awarded. These systems maintain

the definitive record to back up that of the teacher/marker in the case of lost assignments or discrepant grades. They may also allow the analysis and reporting of marking response times. This can be a very important measure of the quality and responsiveness of teaching.

LMS generally allow students to submit assignment work online and will generate an analysable record of the timeliness of receipt, the speed of marking and return, and the grades awarded. However, these systems will rarely allow anyone other than the teacher/marker concerned to monitor these processes. Some institutions are finding that by allowing students to submit assignment work directly to the markers via the LMS, they are losing their ability to monitor this important aspect of student and teacher performance. Institutional leaders need to understand the level of transparency and monitoring that their current systems allow in this regard. They need to ask whether it will be possible to develop ways of monitoring, analysing and reporting performance to programme leaders.

9.1.2.

Online learning technology will generally allow teachers to schedule both formative quizzes and summative tests and examinations online. These can be scheduled for a set time or they can be scheduled on demand by the individual student. In either mode, the duration of the test can be specified or left open over an indefinite period.

The key issues for institutional leaders is how the processes for ensuring the identity of testees and for controlling their access to other resources and assistance during a test will comply with institutional policy and standards on these matters. There is a range of approaches that may be used. At the most relaxed level, students might be asked to attest formally to their identity and to their compliance with any regulations pertaining to examinations. This probably would not deter a determined cheat but it might strengthen the authority of the institution in dealing with a detected malefactor. Insisting that some proportion of assignment work is completed in a monitored environment, to provide a measure of confidence in the assessment of the balance, is another approach. Short, sharp tests scheduled over an hour or two may limit a student's ability to incorporate the work of others. Completing such online tests under the monitoring eye of a trusted local agent is a stronger approach.

This issue of online assessment introduces some significant risks for institutions. TEOs have an obligation to provide both students and teachers with a robust, secure and authentic assessment environment. It is very difficult to ensure that this obligation is being met if individual teachers are developing and managing their own online testing systems, and when there are no formal institutionally driven processes for managing or monitoring these processes.

10. Technological infrastructure

10.1. What sort of technological infrastructure does an institution require to support e-learning?

This document sets out the hardware, software and support considerations for the implementation of e-learning at an institution. Senior managers **must** consult with their IT staff to ensure that system configurations proposed for the institution are exactly as specified by the LMS supplier.

The move to a blended learning environment can herald substantial change to the way in which an institution performs not only pedagogically, but also in a range of other related electronic services. Failure in a critical system, such as a LMS at an important time in the academic year, for example, just before the examinations, can have a catastrophic effect on the institution's reputation. It is therefore of fundamental importance that the technical and management aspects of any LMS are as failsafe as possible.

The purpose of a LMS or similar system is to enhance the learning experience offered to students. The following lists are the functions a system would be expected to perform. The manner in which they are performed is determined by the institution's choice of platform or related systems.

The Montana State University in the USA, as one example, recently (November 2007) released the following specifications for a LMS. (www.montana.edu/wwwpw/Addendum6RFP0803LearningMgmtSystem120307.doc) Its content has been modified to suit the local conditions and are very similar to those used at AUT University.

10.2. What does 'instructional standards compliance' mean? And how important is it that your institution complies with these standards?

Instructional standards compliance concerns how well a product or system conforms to standards for sharing instructional materials with other online learning systems and other factors that may affect the decision of whether to switch from one product to another. Instructional standards compliance involves trying to make it possible for applications from different product producers to work well together.

There are probably two major reasons why an institution might want to ensure compliance with a set of emerging international standards for the development of digital learning objects. The first reason concerns the institution's ability to share digital courseware with other institutions. There is a growing market in digital courseware which allows institutions to avoid the considerable cost of developing all their digital material themselves. But this exchange of courseware is only possible when the authoring and management systems are compatible in a number of

respects. Currently, many of the proprietary authoring systems are not mutually compatible and material developed on one platform may be unintelligible to another system. One way of ensuring compatibility is for a group of institutions to ensure a common development platform among its members. As long as each institution develops its material using the same version of the same software, it will probably be mutually compliant with the other collaborating institutions. However, this level of control is only possible among a small, local network of institutions. Once institutions start using different versions of a system, or start using new systems altogether, compatibility problems will arise.

The second reason why an institution might want to ensure compliance with international standards for courseware development is the likelihood that, at some time, it will wish to migrate to a new LMS. The purchase of a LMS represents a very small proportion of an institution's eventual investment in a LMS, or if open source, almost nothing. A much bigger cost is the investment of staff time in developing digital courseware. If an institution's present LMS is not compliant with a new platform, it can anticipate a major rework project in order to migrate the existing courseware to the new platform. Many of the proprietary systems in use by institutions throughout New Zealand are not fully compliant with emerging international standards and some rework may be unavoidable. However, in selecting a new LMS, an institutional leader may want to avoid this problem repeating itself when it comes time to replace the new system.

There are presently several proposed standards but the most prominent are the standards developed by the IMS Global Learning Consortium that define the technical specifications for interoperability of applications and services in distributed learning and support. The IMS standards can be found at www.imsproject.org. The SCORM standards-in-progress integrate the industry specifications from IMS, AICC, IEEE and ADRIANE and are operational standards with corresponding compliance test suites for learning objects (http://www.adlnet.gov/scorm/index.aspx). In terms of compliance, there appear to be three levels: awareness of the standards, claimed partial compliance and self-tested compliance with the SCORM test suites. Other migration considerations are situations that would make switching to another application more complicated, such as proprietary data formats for content, which make it difficult to import course content into another application. To the extent that student data is maintained in the system, there can be separate complications in migrating non-course information to other versions or platforms.

It may not be practical for institutional leaders to familiarise themselves with the arcane details of interoperability. These are matters that most IT managers find challenging. However, it would be useful for leaders to insist on getting answers to the following questions:

- What level of compliance does our institution currently meet in its use of e-learning?

- What risks or opportunities does this present us with?

- What level of compliance should we be aspiring to?

- What are other providers doing about this issue and should we be conferring with them on this?

- How does any proposed new development affect our targeted level of compliance?

10.3. What sort of server environment will an institution need to support its growing use of e-learning?

The institution should develop its strategy for employing single or multiple server environments for the database engine, application server, etc. The system must demonstrate its architecture in terms of scalability and clearly indicate how it would correct operational problems due to the number of users, amount of data stored or batch and report processes. It must also clearly indicate how the total number of users in the database and a large number of simultaneous users during high volume periods, typical at semester start-up, impact the performance of the LMS. It should describe its hosted environment if applicable. It should also describe how the LMS would position the institution to take advantage of emerging technologies.

All too commonly, an institution's development of its server environment to meet the needs of its e-learning programme will be responsive rather than proactive. A hard-pressed IT manager will be forced to upgrade the server capacity only when the present arrangement starts to fail through overload. A more effective strategic approach would be to ensure that the IT manager works closely with the e-learning manager to anticipate growing demands of this operation with a longer- term plan for server development.

A related issue is that of 'interfaces'. Many higher education institutions use a range of SMS. The institution must ensure a LMS that provides efficient integration with them, including a single sign-on authentication system for both faculty and students, and encryption of communications between client stations, application servers and database servers.

10.4. What should a LMS be able to do?

It is clearly important to identify what functions will be needed before selecting a LMS. This question is less important than it was in the early years of e-learning as most products available have a very impressive array of functionality. Perhaps more important is to ask how the institution will use a LMS and which functions will therefore be particularly important? The following is a list of the functionality that might be sought in a LMS. Institutional leaders should challenge their senior

managers of e-learning to identify which functions they will encourage and support, and how staff and students will be trained in their use.

10.4.1. Learner tools – communication tools

Discussion forums: Discussion forums capture the exchange of messages over time, sometimes over a period of days, weeks or even months. Threaded discussion forums are organised into categories so that the exchange of messages and responses are grouped together and are easy to find. The organisation of the messages can be a simple temporal sequence or they can be presented as a threaded discussion where only messages on a specific topic, called a thread, are displayed in sequence.

File exchange: File exchange tools allow learners to upload files from local computers and share these files with instructors or other students in an online course. Note: File attachments to messages are part of internal email and discussion forums. File exchange tools enable downloading files and upload or posting files over the web from within the course (e.g., assignment drop box or collaboration/group tools).

Internal email: Internal email is electronic mail that can be read or sent from inside an online course. Email tools enable messages to be read and sent exclusively inside the course. They also enable links to external email addresses to facilitate contact between course members. Internal email may include an address book and some address books are searchable.

Online journal/notes: Online journal/notes enable students to make notes in a personal or private journal. Students can share personal journal entries with their instructor or other students but cannot share private journal entries. This tool can be used to facilitate writing assignments in which parts are written over time and then later assembled into a document. This tool also can be used to make personal annotations to pages of a course that can later be used as a study aide. The online journal/notes tool can also be used to record reflections about personal learning accomplishments and how to apply this new knowledge.

Real-time chat: Real-time chat is a conversation between people over the Internet that involves exchanging messages back and forth at virtually the same time. Chat includes facilities like Internet Relay Chat (IRC), Instant Messenger and similar text exchanges in real time. Some chat facilities allow the chats to be archived for later reference so that they may be more easily used as part of a course grading system.

Video services: Video services enable real-time voice and picture (video) interaction as part of the course. Video services include tools for broadcasting video to those without a video input device. Some video services provide for two-way or multi-way

video conferencing, which may be point-to-point connections or mediated through a central server.

Whiteboard: Whiteboard/video tools include an electronic version of a dry-erase board used by instructors and learners in a virtual classroom (also called SMART board or electronic whiteboard) and other synchronous services such as application-sharing, group-browsing, and Voiceover IP (also called VoIP or voice chat). Application-sharing allows a software program running on one computer to be viewed and sometimes controlled from a remote computer. For example, an instructor using this feature can demonstrate a chemistry experiment or a software utility to an online student and allow the student to use the demonstration software from his/her own computer. Group web browsing allows an instructor to guide learners on a tour of websites using a shared browser window. Voiceover IP tools enable two or more to communicate via microphone and speaker conference call style over the Internet connection in real time. Alternatively, a functionally similar tool is used to set up and manage a conference call using the telephone system.

10.4.2. Learner tools – productivity tools

Bookmarks: Bookmarks allow students to easily return to important pages within a course or outside a course on the web. In some cases bookmarks are for an individual student's private use, and in others can be shared with an instructor or with an entire class. Some LMS also allow bookmarks to be annotated. Systems vary in allowing students to store bookmarks in a course folder, a personal folder or a private folder. Course folders are open to all students and instructors in a course. Personal folders contain bookmarks that individual students can share whereas bookmarks in private folders are for the student's own use.

Orientation/Help: Orientation/Help provides tools to help students learn how to use the online learning software, often in the form of a self-paced tutorial, guide or student helpdesk. Orientation/Help tools enable the student to make the best use of the software.. Sometimes additional tools are included to support effective study practices, which can range from simple review tools to mini-courses in how to study effectively. Student helpdesk tools facilitate the tasks of an operator responding to requests for help by student users of the application and may include some online resources directly available to students, such as context-sensitive helpful hints and wizard-style assistants. A student helpdesk does not typically offer help with course content.

Plan/Progress review: Student progress review tools enable students to plan for their workload and assignments typically through a course calendar. This may include the use of an online calendar. Student progress review tools enable students to check marks on assignments and tests as well as their progress through the course material. In some tools there are additional provisions to support student workload planning as well by means of a calendar-type tool.

Searching within course: Searching within a course is a tool that allows users to find course material based on key words. Searching tools enable students to locate parts of the course materials on the basis of word matching beyond the user's current browser page (which can be searched using the browser>edit>find menu).

Work offline/synchronise: This feature provides the ability to work in the course environment offline, and for the work to be synchronised with the next login to the course environment. In some products, the resume course function also lets users save their place in an online course. This applies to work on PDAs. The ability to work in a course environment offline is especially useful in situations where communication links are unreliable or expensive. This offline environment is essentially a local client application that embodies the important features of the online system without the constant connection to the Internet. When the user resumes the course, the resume course tool could be used to take users directly to the page of the course or the shareable content object where they had stopped working.

10.4.3. Learner tools – student involvement tools

Group work: Group work is the capacity to organise a class into groups and provide group workspace that enables the instructor to assign specific tasks or projects. Some LMS also enable groups to have their own communications features like real-time chat and discussion forums.

Self-assessment: Self-assessment tools allow students to take practice or review tests online. These assessments do not count toward a grade. When self-assessment tools are combined with pedagogical skill in preparing the content of the test items and response feedback, there can be positive effects on student motivation that are formative in nature.

Student community-building: Student community-building tools enable online instructors to create communities for students to share ideas or build knowledge. Student community-building tools can include facilities to encourage and enhance morale. These tools allow the instructor to create and manage small groups using discussion threads, chats or other course tools in a larger class so that small group members can interact with each other enough to develop friendships.

Student portfolios: Student portfolios may be used by students as personal homepages or may be a place for them to showcase their work in a course. This is becoming an increasingly important part of student work and will require substantial upgrades to server storage requirements over time.

10.4.4. Support tools – administration tools

Authentication: Authentication is a procedure that works like a lock and key by providing access to software or a computer system by a user who enters the

appropriate user name and password. The term also can refer to the procedure through which user names and passwords are created and maintained. Authentication systems can involve a single logon, which is the most user-friendly and most vulnerable to hacking. More complicated systems can involve layers with separate logins for each layer and secure encryption. For those working in multiple campus or multiple institutional environments, the product 'Shibboleth' (http://shibboleth.internet2.edu) should be evaluated for its utility.

Course authorisation: Course authorisation tools are used to regulate who can use the software and in what way. Authorisation tools assign access privileges and other privileges to specific users or user groups (e.g., teaching assistants and designers).

Hosted services: This section refers to having all the online learning activity supported outside the institution. Hosted services mean that the online learning application provider furnishes the application with the server and technical support from its location so the institution does not provide any hardware. Off-site hosting involves hosting courses from servers at the application provider's location so that the local institution does not need an application server or the associated network hardware and software (a.k.a. outsourcing web services). An important aspect of outsourcing course hosting is that it includes outsourcing the associated technical support and maintenance as well as the actual web service of providing courses.

Registration Integration: Experience shows that this is a very important part of the system. Most LMS take nightly feeds from the SMS as the single source of reliable data, and the systems must be fully integrated, hence the importance of having software written to proper specifications. Registration tools support the enrolment of students in an online course, either by the instructor or through self-registration of the students themselves, or through integration with the SMS. Some registration tools allow instructors to enrol students in batches through the use of formatted text files. Time-limited student self-registration may also be available to shift the data entry process to the students. This feature includes the integration of the online LMS with an administrative student registration or information system. Integration with SMS tools provides the ability for the application to work with known SMS. Typically, integration will allow for the following types of functionality: shared common student information, ability to transfer grades back and forth, and ability to have common accounts. The registration tools for secure transactions may also involve making additional arrangements with financial institutions for the funds to be transferred to the institution, and these arrangements may have a separate cost structure.

10.4.5. Support tools – course delivery tools

Automated testing and scoring: Automated testing and scoring tools allow instructors to create, administer and score objective tests. Some products provide support for proctored testing in a suitable computer laboratory classroom as an approach to ensuring academic honesty.

Course management: Course management tools allow instructors to control the progression of an online class through the course material. Course management tools are used to make specific resources in a course, such as readings, tests or discussions, available to students for a limited time only or after some prerequisite is achieved. This deliberate unfolding of the course resources can be used to prevent students from being overwhelmed and discouraged. Some LMS enable this course management to be individualised so that the course experience can be tailored to accommodate individual learner situations.

Instructor helpdesk: Instructor helpdesk tools include resources available for instructors who need help using the LMS software. This does not typically include assistance with content. Instructor helpdesk tools may enable instructors to create a community with other instructors to share ideas or build knowledge. This service is normally supplemented by specialist staff dedicated to staff support.

Online grading tools: Online grading tools help instructors mark, provide feedback on student work, and manage a grade book. Online grading tools enable instructors to mark assignments online, store grades and delegate the marking process to teaching assistants. Some tools allow instructors to provide feedback to students, to export the grade book to an external spreadsheet programme and to override the automatic scoring.

Student tracking: Student tracking is the ability to track the usage of course materials by students and to perform additional analysis and reporting both of aggregate and individual usage. Student tracking tools include facilities for statistical analysis of student-related data and the display of the progress of individual students in the course structure. The data generally consists of both activities and the time stamps of when the activity occurred.

10.4.6. Support tools – curriculum design tools

Course templates: Instructors use templates to go through a step-by-step process to set up the essential features of a course. Course templates are artefacts of particular pedagogical approaches to instructional content and process. The local value of particular templates will depend in part on the match between the template designer's approach and the specific instructor's approach. A LMS should accommodate several pedagogical approaches.

Curriculum management: Curriculum management provides students with customised programmes or activities based on prerequisites, prior work or testing. Curriculum management includes tools to manage multiple programmes, to enable skills/competencies management and to handle certification management. These tools may be similar to the tools used in student services as part of providing academic advice to students.

Customised look and feel: Customised look and feel is the ability to change the graphics and look of a course. This also includes the ability to provide institutional branding for courses. Customised look and feel also includes the branding of content with institutional logos and navigation to provide a consistent look and feel across the entire institutional site and integration with additional institutional resources, such as the library. Consultation with the institutional marketing department may be advisable.

Instructional design tools: Instructional design tools help instructors create learning sequences, e.g., with lesson templates or wizards.

Designer file and content management: The LMS should allow the course designer/instructor to easily move a variety of files, course modules and other content into and out of a course.

10.4.7. Third-party modular and extendable functionality

Third-party content: Instructors often speed up their development and delivery of online courses by utilising third-party content resources such as course cartridges/e-packs, standalone learning objects and other kinds of modules or resources that are in addition or external to the content they create within an online course. An institution's system must allow the use of standards-compliant third-party software to encourage academic staff to make the best use of the system.

Assessment tools: Assessment tools allow an instructor, programme or institution the ability to track key performance indicators and perform evaluation and assessment at the student, programme and college level.

Content management tools: Management of content for updating and for rolling over courses is a necessary feature involving some costs additional to the cost of a Learning Management System. An institution's LMS should be able to accommodate a CMS if it is not already integrated in a comprehensive package.

10.4.8.

ePortfolio tools: ePortfolio tools allow students to upload, manage, share and maintain assignments, assessments, materials and other artefacts from their educational experience. The student portfolio may persist and be accessible to students and its designees, such as potential employers, beyond graduation. Such a feature generates linkages to Alumni but also involves significant additional storage.

10.4.9. Conversion solutions and performance information

Conversion/Migration solutions: Institutions choose to change platforms from time to time. Any LMS should be able to provide the programmes/tools/staff necessary to

migrate existing course content to the new LMS. It should be noted that this is no easy task, not only technologically, but also in terms of staff training.

10.4.10. Security

Every tertiary institution is very concerned about security and requires all new systems and services to integrate with existing security controls. Any LMS must supply documentation on security administration procedures and security controls of the LMS.

Access and security strategies: A LMS should have access strategies and appropriate levels of control within the solution. Detailed descriptions of supported authentication and authorisation mechanisms, as well as access logging and accounting capabilities, must be provided in the documentation.

Security provider: The LMS must clearly explain what security features and capabilities are incorporated in it. Documents must clearly explain the security functions of any proposed third-party software and must clearly explain the security processes, structures and the maintenance required for each.

Database security relationship: The LMS must clearly explain how the security supplied with the solution interacts with database security (e.g. is database security used, respected, by-passed?). Which database systems and versions does the product support?

External security standards: The system documents must clearly explain how the solution addresses externally mandated security standards and other security compliance standards. If this is supplied through third-party software, it must clearly specify the vendors and products that are recommended or required to work with the solution being proposed.

Future compliance: LMS documents must clearly explain how the security components of the proposed solution can be adapted to enable the institution to comply with external and internal audit requirements in the future.

Security integration scenarios: The documents must clearly explain how the security features/components in the solution perform under each of the following scenarios: common end-user security methodologies, the system administrator's security duties and any security best-practices implementing the proposed LMS into a typical institution's infrastructure or environment.

Accessibility compliance: This means meeting the standards that allow people with disabilities to access information online. Persons with disabilities (e.g., the blind) use a device to 'read' the screen. Accessibility for persons with disabilities entails providing for a version that can be processed by a screen reader. Many screen readers have difficulty rendering frames, tables and images (without alt text tags).

The practical accessibility difficulties are compounded by the fact that many people with disabilities do not have recent equipment and software. Any LMS must allow legal compliance requirements for disability access to be met.

10.5. What other IT support issues will you face?

Firstly, there are a number of requirements that institutions need to fulfil to ensure security of service for this medium. These include:

- managing the institutional licence for the LMS;

- hosting the LMS and all online courseware on secure central servers;

- managing all updates of courseware on a recurring basis, retaining copies of previous versions;

- managing the relationship with 'course controllers', ensuring the roll-over of course material from offering to offering;

- managing a secure register of student users and their authorised access to online courseware and other online services and databases (in particular, managing the interface between the LMS and the institutional SMS);

- maintaining a confidential record of all course-related communications, particularly any online assessment, testing or examinations;

- generating appropriate reports on system usage.

These services will generally be provided by a central institutional unit, either a specialised e-learning support unit or a subset of the institution's IT division. There are high risks associated with most of these services and devolving them to programme units is seldom seen as a prudent or an economic option.

Secondly, there are some significant networking and end-user issues that institutions must address. Any member of staff involved in developing, teaching or assessing online courses will require regular, secure access to an appropriate workstation which will need to be part of a secure institutional network of adequate capacity and performance. If it is intended that campus-based students should access e-learning resources, then they will also need appropriate access, either through computer laboratories – which will require managing – or by implementing wireless networking on campus. The latter strategy, increasingly favoured, will place responsibility for providing end-user hardware on individual students. In other words, they will need to buy their own wireless-enabled laptops. Any institution contemplating this step will need to demonstrate the value students can expect to receive in terms of educational services. This is, therefore, another reason why institutions need to avoid piecemeal commitment to e-learning on the part of individual teachers and course developers. A student may accept the one-off expense of purchasing a laptop and software if these will be heavily used throughout a programme; they will be far less tolerant of a

requirement to purchase such equipment if the use is restricted to one or two components of a larger programme.

Thirdly, the institution is likely to want to produce or commission multimedia learning resources that exceed the capacity of the workstations available to teaching staff or possibly the skills and available time of those staff. Decisions need to be made about the teaching and related services that are being supported through these media, about the particular media that will be supported, about the levels of investment that are sustainable and about the sourcing of these services – preferably in that order.

So, for instance, a decision might be made that students in a programme require online access to digital video recordings of laboratory sequences. This may lead to a decision to support a particular means of recording this laboratory work and incorporating the material into online courseware. The use of this mode should be budgeted within available resources, taking into account the scale of the operation and any possible re-use or sale of the material. Finally, the production work needs to be undertaken either by a unit within the institution or outsourced on contract to an outside agency. All too commonly, institutions reverse the sequence, developing their own multimedia production centre, giving it an annual one-line budget and then allowing it to set its own production programme, based on criteria that suit their interests rather than those of the end-users.

This is not an argument against setting up multimedia production centres within institutions. As the scale and sophistication of an institution's e-learning grows, so does the case for owning and managing the production facilities. However, there are some strong arguments in favour of outsourcing these services while the internal demand is relatively small or uneven or where teachers are wanting to use a range of different media to support their teaching. The institution is able to avoid a substantial up-front investment in staff and equipment for what may be short-lived technologies. It is also forced to acknowledge and meet the cost of each commissioned product or service rather than have these choices obscured by the sunk costs associated with an existing institutional unit.

A fourth and critical infrastructural issue is the extent to which e-learning courseware and e-learning services are integrated with other online services operated by the institution. These issues have been canvassed elsewhere in this report but they raise once more the question of strategic leadership and the locus of responsibility for e-learning.

10.6. How should you choose a LMS?

The great majority of institutions will want to support the use of one or more LMS across the institution. A LMS is a set of computer programmes that provides a framework for courses to be developed, taught and managed online. The need for some sort of LMS is abundantly clear. From an institutional point of view, a LMS

provides a framework that is functional, robust, transparent, manageable and reasonably predictable in terms of cost and performance. Teachers are able to develop their courses and teach and assess their students on a stable, predictable platform without having to develop or even understand these background operations. Students enjoy a similar set of advantages to their teachers and also have the assurance that both the institution and the LMS provider have an active interest in maintaining a reliable service.

The real question is not whether but which. Ten and more years ago there was a variety of emerging, developing LMS all looking to expand their user base. Institutions made their selection on a range of home-grown criteria. These commonly included:

- the range, ease of use and applicability of functions available through the LMS;

- the size of the user base for the LMS, particularly the New Zealand user base;

- whether the LMS in question is being used or considered by institutions with which an institution is collaborating or anticipates collaborating;

- the service record of the supplier, particularly their demonstrated willingness to continue to develop their product to meet changing sector needs;

- the cost and the business model available for the LMS and, in particular, the scalability of the cost structure to meet anticipated growth;

- the ability of the LMS to articulate with other relevant online database services such as the institution's SMS, academic programme database, finance system and library;

- the ability of the institution to protect its own intellectual property that may be used in conjunction with the LMS;

- the ability of the institution to host and manage the LMS and courseware on its own servers where this was seen as desirable;

- the feasibility and costs associated with shifting from the original LMS to another in future.

These criteria remain equally valid today. However, the several dozen contending proprietary LMS of a decade ago have been reduced to three or four major players today. These all tend to have similar levels of functionality and performance against the other listed criteria. So, institutional leaders should certainly expect a robust comparison to be made between the competing claims of, say, Blackboard if they are in the market for a proprietary product. The issue that is arousing much more interest and debate currently is whether institutions should choose a proprietary product or opt for an open source solution for their e-learning. 'Open source' is the term most commonly applied to software whose source code is available to the general public

with relaxed or non-existent intellectual property restrictions. This allows users to create software content through incremental individual effort or through collaboration.

The case for open source solutions is passionately advocated by its proponents. Open source solutions leave the ownership and control of the system in the hands of the user. They can be modified at will to meet the needs of the user and they avoid the legal and financial entanglements of service contracts with proprietary suppliers. On the other hand, they tend to mean that the institution must shoulder the responsibility, costs and risks associated with developing and maintaining its own open source solution. This will be a particular concern for a small institution for whom the development and maintenance costs associated with an open source solution will be similar to those facing a much larger institution.

Probably the key consideration for an institution confronting this choice will be to keep in step with decisions being made by other institutions in the sector, particularly with those institutions with which the institution is collaborating in its provision or support for e-learning. Where a significant group of institutions is making a commitment to collaborating on the development and support of an open source solution, this may be a sensible solution to embrace. Where an institution is faced with developing and maintaining its own unique open source solution, it might be more prudent and more economic to sign up with a proprietary product.

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