

**E-LEARNING
IN NEW ZEALAND
INSTITUTES OF TECHNOLOGY/
POLYTECHNICS:
FINAL REPORT**

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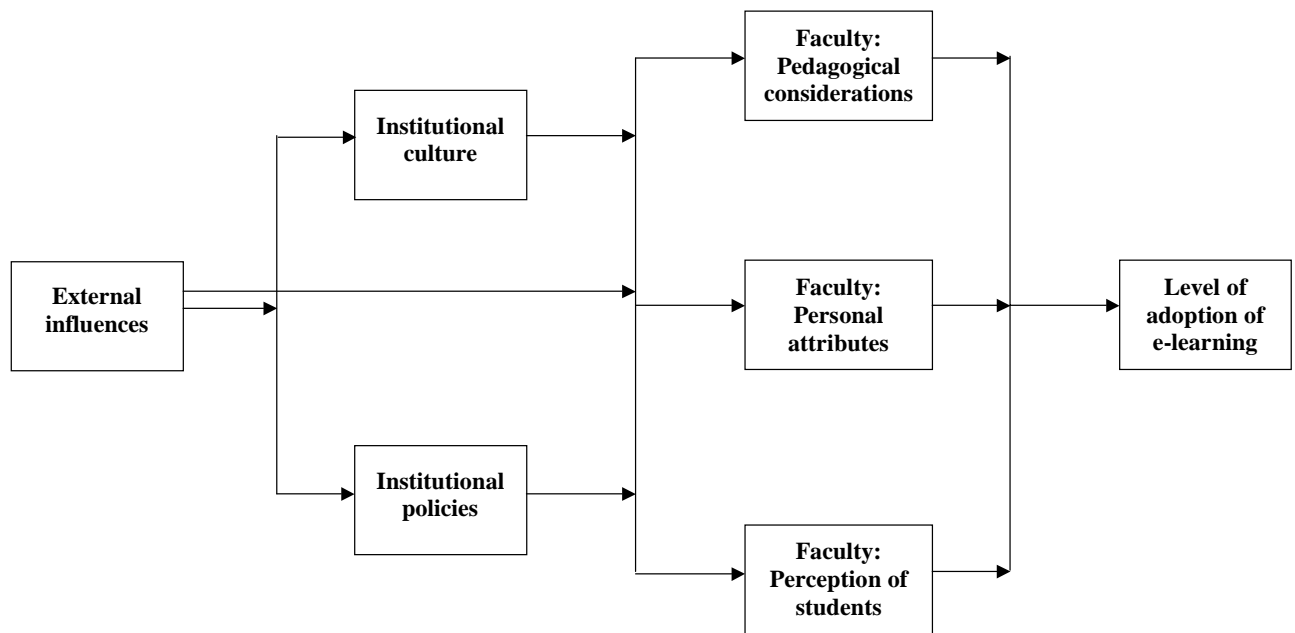
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EXECUTIVE SUMMARY

1. In response to some of the objectives of the Tertiary Education Strategy 2002-2007 and the recommendations of subsequent strategies around ICT and e-learning, the Ministry of Education is administering the **Tertiary e-Learning Research Fund** to support the conduct of research into e-learning in the tertiary sector.
2. This report is the final report of the project, *Learning from Adopters and Resisters of E-Learning*, based at Waikato Institute of Technology, Hamilton, New Zealand. The main **goal of this project** was to investigate the factors that lead teaching staff in New Zealand Institutes of Technology/Polytechnics (ITPs) to adopt or resist the incorporation of e-learning approaches into their teaching practices.
3. The research had four main **phases**:
 - Phase 1*: A literature search was conducted.
 - Phase 2*: The managers of e-learning in all 20 ITPs were surveyed to determine their institutions' e-learning policies and the extent to which e-learning had been adopted. Eighteen managers responded, yielding a return rate of 90%. As well, an analysis of publicly available policy documents for each of the 20 ITPs was carried out.
 - Phase 3*: Case studies were conducted in three ITPs. In these, the following tasks were carried out: (a) an analysis of policy documents pertaining to e-learning, (b) interviews with key management personnel with roles in e-learning, and (c) focus group interviews with a range of tutors.
 - Phase 4*: Teaching staff in all New Zealand ITPs were surveyed online to determine what factors influence their adoption or rejection of e-learning. A total of 831 tutors responded to the survey. This figure represented 23.6% of full-time tutors, a return rate comparable to other large-scale surveys reported in the literature.
4. The principal findings of the study are arranged according to the variables outlined in the following model.



5. Level of Adoption of e-Learning in ITPs

5.1 A key aspect of the project was a **category system** that addressed tutors' levels of adoption of e-learning. Briefly, five categories were identified:

A. Embracers: advanced knowledge of e-learning/ thoroughly familiar with LMSs/ use e-learning to transform teaching...

B. Modifiers: understand e-learning tools and use selection of them/ exploring Learning Management Systems (LMSs)/ mainly focused on transmission of content...

C. Examiners: limited grasp of e-learning, but considering its possibilities/ use low-threshold technology/ exploring placing some material online...

D. Doubters: know a little/ not actively exploring/ satisfied with existing pedagogy...

E. Refusers: not interested/ know little about e-learning/ philosophically opposed...

5.2 Overall, the following self-identifications of tutors' **levels of adoption** of e-learning in their teaching were obtained: Embracers (11.9%), Modifiers (45.5%), Examiners (33.5%), Doubters (8.92%), Refusers (0.2%). These figures suggest that the sample was somewhat skewed towards the 'higher' end of adoption, although other data showed that 51% of the sample were not currently engaged in designing and/or delivering e-learning courses.

5.3 Responses from e-learning managers on the **management of e-learning** indicated that it was centrally managed in just under half of the ITPs, with another third opting for a model of devolved responsibilities within institution-wide integration.

5.4 With reference to **trends over time**, the bulk of the 18 e-learning managers considered that e-learning adoption was increasing, rapidly in the case of 4 and slowly in the case of 12. Two considered that it was plateauing, while none thought that it was decreasing. A related point is that e-learning managers noted considerable increases in Embracers and Modifiers from 2000 to 2004 and they anticipated even greater increases in those categories for the next four years.

- 5.5 In 90 percent of the ITPs, virtually all of the teaching staff had **e-mail accounts** and a significant majority of tutors reported using **personal e-mail** in their teaching practice. Significantly, **telephone support** was less widely used.

It could be argued that the use of e-mail is more highly valued as it is not reliant on time or place, while the telephone is a somewhat haphazard form of connectivity. There was a clear trend towards Embracers and Modifiers finding *both* e-mail and telephone support more valuable than Examiners and Doubters/Refusers in their teaching, possibly suggesting that Embracers and Modifiers are more ‘tuned in’ to communicating with their students, irrespective of the medium.

- 5.6 **Audio conferencing via computers** was little used by tutors in general and, of those who did employ this approach, most found it to be of little or no value. Embracers were more likely to use it than the other groups, but even then only 45% of them employed it.

Using audio conferencing via computers (i.e., voice over internet protocols (VoIP)) raises a number of issues. Firstly, the potential limited internet capacity, broadband, of participant’s computers limits the use of these tools to fairly robust high broadband networks. Secondly, the complex nature of the e-tools requires a highly technically literate participant to operate them successfully. Finally, participants’ computers must have the necessary hardware, such as a graphics card and the processing speed for the tools to function. Therefore, it is not surprising the use of audio conferencing via computers is not widely used. It could be as VoIP technology becomes increasingly robust and reliable it will be more widely utilised.

- 5.7 Although personal e-mail was valued, general communication strategies using **e-mail discussion groups** were not widely used, except among Embracers, where just over half employed the approach and most found it to be valuable. In contrast, only one-quarter of Doubters and Refusers used this method and, of those who did, the vast majority considered it to be of little value.

It could be argued that the perceived increased number of e-mails received during e-mail moderated discussion and the resultant increase in tutors’ workloads generated by managing and responding to these e-mails is a major factor in tutor’s lack of use, and perception of limited value, of these strategies. It could also be argued that the e-tools provided by multi-functional single-space learning management systems have made this method of communication obsolete.

- 5.8 Fewer than half the tutors surveyed used **video/audio conferencing**. Even among the Embracers, only 45% used this approach in their teaching. Of those who did employ it, few found it valuable or very valuable. For example, only 10% of Embracers gave it high marks.

The use of these synchronous e-tools is based on the assumption all participant’s will be available at a specific time, and in the case of video conferencing, where delivery and reception hardware is required, they are further constricted to be in a specific place. The complex nature of e-tools requires a robust technical infrastructure and a sophisticated, technically literate participant to operate them successfully. Only a limited number of ITPs have invested in the development of an infrastructure to use video and audio conferencing tools and they are therefore not widely used.

- 5.9 With the exception of Embracers, **discussion groups and chat rooms** were little used. About two-thirds of Embracers employed un-moderated discussion groups in their teaching, the majority of whom found them to be of value. By comparison, only one-quarter of Examiners, Doubters and Refusers used such approaches, most of whom rated them of little or no value. A similar pattern occurred with respect to the use of chat rooms.

A number of tutors appeared to be unaware of the perceived benefits of using student-to-student collaboration e-tools such as chat and discussion groups. For example, the benefits derived from peer collaboration on student achievement, retention and satisfaction may well have been under-estimated. This suggests that tutors need to be regularly exposed to research and case studies demonstrating successful creation of e-learning environments using multiple e-tools. These should focus on how the provision of a range of e-learning activities, regardless of student location, enhances and enriches the learning environment of all students.

- 5.10 Tutors made wide use of **remote access to library electronic databases** in their teaching. As might be expected, Embracers and Modifiers were most inclined to use this approach (around 80%), most of them reporting that it was valuable or very valuable. Even over half of the Doubters and Refusers used it and mostly found it valuable/very valuable. Similar findings occurred in relation to the use of hyperlinks and accessing files from course websites.

It could be argued there is a need to ensure that library staff and other information specialists are fully included in discussions of e-learning activities contemplated within an institution and that they are asked to provide advice and assistance on the services and e-resources they can provide.

- 5.11 The use and provision of **web-based course materials** to students was highly correlated with the tutors' degree of adoption of e-learning. Thus, while over 90% of Embracers utilised this approach, only a little over one-quarter of Doubters/Refusers did so. Correspondingly, the vast majority of Embracers who used it rated it very highly, whereas the users in the other groups had a more mixed response.

These findings suggest that tutors need to be regularly exposed to research and case studies demonstrating the benefits to students of providing material via the web. These should focus on how the provision of digital material, regardless of student location, enhances and enriches the learning environment of all students.

- 5.12 Tutors' use of **CDROMs** in their teaching varied from 60% of Embracers to 36% for Doubters and Refusers, with the other two groups ranging between these two extremes. Of those who did use them, most found them at least moderately valuable.

It is significant that, given firstly, the publishing world's production of supplementary CDs with text books and the increasing development of interactive CDs by educational providers and, secondly, the potential reduction in the required broadband capacity of student computers, that this resource is not widely used or valued by a significant majority of tutors.

- 5.13 While two-thirds of the Embracers included **downloadable audio or video files** in their teaching, only one-half utilised **streaming audio or video files**. A similar shift occurred with Doubters and Refusers, the comparable proportions being one-half and one-quarter, respectively. The bulk of tutors who did use downloadable

audio or video files considered this approach to be valuable, whereas those who used streaming audio or video files were more mixed in their judgments.

It could be argued that tutors are conscious of a number of issues that the presentation of sophisticated e-learning content generate. Firstly, the potential limited internet capacity, broadband, of participant's computers limits the use of this content to robust high broadband networks. Secondly, the complex nature of the e-content requires a highly technically literate participant to create and view them successfully. Finally, participant's computers must have the necessary hardware, such as a graphics card and processing speed, for the content to be speedily accessed. The use of media-rich content seems not to be highly valued or used.

- 5.14 **Web-based testing** was not widely utilised, other than among the Embracers. Of the Embracers and the Modifiers who did employ this approach, it was generally found to be of some value, the opinions of the tutors in the other two groups being more mixed.

It appears that significant e-tools designed to reduce the tedious task of marking and recording simple assessments are not widely used by tutors. It may be that institutional academic policies, processes and procedures regarding assessments and accreditation do not fully address the issue of delivering assessments via the web and, instead, favour traditional face-to-face institution-based examinations as the only means of valid assessment.

- 5.15 While over 80% of Embracers used **web-based administration materials**, the remaining tutors' usage ranged from just over half in the case of Modifiers down to around one-quarter for the Examiners and Doubters/Refusers. The Embracers who utilised this capacity were almost unanimous in the value they placed on it, the other users awarding it more mixed ratings.

Given the potentially large institutional financial investment in the provision of web-based services and information it is significant that these e-tools, which are designed to reduce academic queries and provide student information services, are not more widely used. Potentially, these e-tools could reduce tutors' workloads and provide students with more immediate responses. It could be argued there is a need to ensure that student support staff are fully included in discussions of e-learning activities contemplated within an institution and are asked to provide advice and assistance on the services and information these support services can provide.

- 5.16 The **preferred Learning Management System (LMS)** used within the ITP sector was the proprietary system Blackboard, closely followed by the open source system Moodle. Tutors' utilisation of **LMSs** such as Blackboard and Moodle was highly correlated with their levels of adoption of e-learning. Thus, nearly all Embracers used an LMS and the vast majority rated it as being valuable or very valuable. At the other extreme, only 25% of Doubters/Refusers used an LMS, most of whom rated it of little or no value. The other two groups fell within this range, with Modifiers being more similar to Embracers and Examiners more similar to Doubters/Refusers.

Given that there is a correlation between exposure to the integrated e-environments created by LMSs and the use of new e-teaching techniques, it is

recommended that tutors be exposed to these systems if e-learning activities within individual institutions are to increase.

From the above findings, it is clear that tutors vary greatly in their use of various components of e-learning-related technology. This poses particular challenges to those responsible for formulating and implementing e-learning policies in ITPs: while some are advanced exponents of e-learning and incorporate a considerable array of its component parts, others are barely at the starting line. Equally clearly, any professional development programme aimed at expanding the uptake of e-learning must accommodate to this diversity of skills and attitudes. A one-size-fits-all approach must give way to a more targeted, customised approach.

To address these issues, it is recommended a limited number of e-learning software applications be used within an individual institution. It would appear the adoption of multi-functional single-space learning management system is advisable.

6. External Influences

- 6.1 In general, tutors agreed that **employers' expectations** for e-learning were more likely to facilitate than inhibit their adoption of e-learning, a view that did not differ greatly from group to group. Just under half of the e-learning managers thought this factor was critically or very important, with just over half rating it as being only of moderate or little importance. However, in all three of the case study institutions it was clear that management was perceived to be under pressure from employers of potential graduates to produce the kind of employees they need, in particular graduates with advanced skills and competence in computing and information technology.

Further work needs to be done to ascertain employers' expectations regarding ITPs making available courses utilising e-learning approaches, and those expectations should be conveyed to tutors.

- 6.2 Tutors felt that **students' expectations** neither facilitated nor inhibited their adoption of e-learning. Embracers were somewhat more likely to see students' appreciation of e-learning's value as an influence than were Doubters/Refusers, with the other two groups somewhere in between. The e-learning managers rated students' expectations as the most important of seven listed factors in driving the development of e-learning in their institutions. In the case studies, managers, and to a lesser extent, tutors were aware of an increasing student demand for flexible and technology-rich learning environments in which barriers created by time and space are reduced. There was also an impression that students expect on-campus courses to be enhanced by e-learning, allowing them access to the web, the library, student facilities and tutors.

Here, too, further work needs to be done to ascertain students' expectations with regard to accessing courses taught through e-learning approaches. This applies to on-campus, as well as to off-campus students.

- 6.3 Tutors saw the need for their institution to obtain a **competitive advantage** through e-learning as a very influential factor, irrespective of their level of adoption. e-learning managers had a range of views as to the importance of this

factor, with opinions ranging right across the spectrum, Competition from other providers was a very important issue for management and tutors in one of the case studies, but less so in the other two.

The reality is that e-learning (or, perhaps, more broadly, 'flexible learning') is here to stay and is likely to increase rapidly among tertiary institutions). Individual ITPs ignore this at their peril and will need to incorporate e-learning significantly if they are to be attractive to students and thus remain competitive.

7 Institutional Culture and Policies

- 7.1 The effect of **management support** for e-learning was rated by tutors as having neither a facilitating nor an inhibiting effect on their uptake of e-learning, but with a trend towards the former effect. There was only a low positive relationship between tutors' levels of e-learning adoption and their ratings of management support. When asked to give their views on the extent to which organisational structures in their institutions constituted barriers, the e-learning managers were spread across the spectrum, with a mean rating signifying that these structures constituted only a moderate barrier.

Clearly, without management support and encouragement, e-learning will develop only slowly, if at all. Any innovation requires leadership at all levels of an institution, but particularly at the senior management level, if it is to be taken up

- 7.2 e-learning managers' views on the degree to which a lack of an **institutional policy** on e-learning constituted a barrier in their institution ranged across the spectrum, with approximately one-third rating it as a major or significant barrier, another third as a moderate barrier and the final third as only a minor barrier or no barrier at all. All three case study institutions had long-term policies in place, although some of these were considerably more advanced than others. All were committed to e-learning, and establishing comprehensive and specific policies was an important goal in each of them.
- 7.3 Tutors generally considered that their access to **professional development** that was focused on e-learning was neither facilitating nor inhibiting, but with a trend towards the former. There was a low positive relationship between tutors' levels of e-learning adoption and their ratings of access to professional development. However, there was a consensus among e-learning managers as to the importance of tutors having access to such professional development if they were to implement e-learning, with 17 of the 18 rating it as critically or very important. Management and faculty in all three case study institutions recognised the urgent need for professional development that would provide tutors with the technological skills they need to fully utilise e-learning. To a lesser degree, they were aware that the introduction of e-learning would result in changes to teaching and learning methodology and that this would create a demand for pedagogical professional development.

Appropriately-resourced and clearly-targeted professional development programmes are the *sine qua non* for introducing and expanding the uptake of e-learning. Such programmes need to take account the findings in this report and other research. In particular, they should recognise the diversity of skills and attitudes that exist among tutors and the range of pedagogical possibilities that modern (and future) technology offer.

- 7.4 The availability of adequate **time to develop e-learning courses** scored the lowest of 30 variables that were investigated in the tutor survey, indicating that they generally found this to be inhibiting. This was the case across the board, even for Embracers. There was a consensus, too, among e-learning managers as to the importance of tutors having adequate time to learn about and develop material if they were to implement e-learning. All 18 respondents rated this as being critically or very important, the mean rating being among the very highest. This issue was a major one for faculty in the first case study institution, where faculty regarded the time involved in this process as a major deterrent to adopting e-learning. They claimed that management greatly underestimate the time it takes to set up new courses or to modify existing courses. In a second institution, management and faculty were aware, from the experience of other providers, that the development of digital material could increase the time spent on the development of course material and they admitted that this could be problematic. However, the limited experiences of the institution and of individual tutors in the development of digital material meant that neither management nor faculty had any clear idea about how much time would be needed in developing e-content for courses. In the third institution, management asserted that while tutors might be concerned about the additional time needed to develop courses, this was only because they were new to technology. Managers argued that experience showed that introducing technology reduces workloads in the long-term, so using technology would increasingly become less of a burden. Faculty in this institution expressed no concern about the additional time needed to develop courses.

This finding is of critical significance and poses a challenge for ITPs to invest resources to provide sufficient time for tutors to become skilled in developing and implementing e-learning courses.

- 7.5 Tutors' perceptions of the impact of e-learning on their **out-of-office time** was rated fourth equal lowest of the 30 variables, the mean trending it towards being an inhibiting factor. There were negligible differences among the ratings of this variable made by tutors according to the four levels of adoption. In other words, there was a general concern about the effects of e-learning on tutors' discretionary time. In a similar vein, e-learning managers considered tutors' perceptions that adopting e-learning would not unduly impact on their out-of-office time was very important or moderately important in their decisions to adopt it.

It is clear that individual tutor workloads would be affected by the introduction of e-learning and the associated growth of tutor-student communication, a finding that calls upon skilled management of human resources.

- 7.6 Participants in all three of the institutions studied were aware of the need to adequately **resource the introduction of e-learning**.

This involves providing funding that would finance professional development opportunities, providing time for tutors to create digital material and providing a reliable technical infrastructure, all of these constituting recommendations arising from the study

- 7.7 **Management support** for e-learning was rated by tutors as having neither a facilitating nor an inhibiting effect on their uptake of e-learning, but with a trend towards the former effect. This pattern was true of all levels of adoption. All bar

one of the e-learning managers rated this factor as being from moderate to critical importance.

It is therefore recommended that ITPs' management develop an overall plan and specific strategies for supporting tutors in developing skills in e-learning approaches.

- 7.8 Tutors in general considered the availability and quality of **technical support** to develop e-learning activities to be neither facilitating nor inhibiting, but with a trend towards the former. This pattern was true of all levels of adoption. The bulk of the e-learning managers rated technical support for developing and delivering e-learning as being critically or very important. Tutors in all three case study institutions expressed concern about their technological competence and the lack of a robust technical infrastructure.

It is thus recommended that ITPs ensure that an adequate technical infrastructure be put in place to support the development and implementation of e-learning. The focus of such support could well be on assisting staff to implement the range of functions outlined in section #5 above.

- 7.9 The degree of importance tutors attached to collective **employment agreements** was spread across the range, with e-learning managers rating it as moderately important, while tutors themselves saw it as a somewhat inhibiting factor, irrespective of their level of e-learning adoption.

These findings suggest the need for ITPs to consider the place of e-learning in their contracts with staff.

- 7.10 To the tutors, resolution of **intellectual property rights** constituted the third lowest rated issue, the mean indicating that tutors felt it was neither facilitating nor inhibiting. There were negligible differences among the ratings made by tutors according to the levels of adoption. e-Learning managers' opinions on the satisfactory resolution of intellectual property rights as a determinant of tutors adopting e-learning were spread across the range, with a mean placing it in the very (but not critically) important category.

Notwithstanding this range of opinion, the researchers consider that ITPs should develop clear intellectual property policies relating to e-learning resources developed by staff.

- 7.11 Almost identical comments to the intellectual property rights can be made with respect to the effects of providing **rewards and incentives** for undertaking e-learning. In the tutors' survey, the mean score on this variable was the lowest of the 30 surveyed and the extent of the differences between the various categories of adoption was also the lowest recorded. e-Learning managers' views were consistent with these results, with 8 of the 18 claiming that rewards and incentives for staff were critically or very important, while the remaining 10 considered them to be of only moderate or little importance. The mean rating was one of the least important for the 27 factors considered by the managers.

These results suggest that involvement in e-learning should not necessarily attract greater rewards for staff than any other area of their teaching.

- 7.12 **Size of institution** seemed to influence the extent of e-learning adoption, with a trend for tutors in larger institutions to have higher levels of e-learning adoption than those in smaller institutions.

These results pose a challenge for small ITPs where there are no economies of scale. A bare minimum of support structures is required for developing and implementing e-learning, especially beyond those in the Embracer category.

8. Pedagogical Considerations

- 8.1 Tutors in general considered that institutional support for them to work **flexible hours** was neither facilitating nor inhibiting, with a trend towards the former. e-Learning managers' opinions on this issue ranged across the scale, with 12 of the 18 claiming that it was critically or very important to tutors, while the remaining 6 considered it to be of only moderate or little importance. The mean rating placed it near the middle of the 27 factors considered. All three case study institutions were aware of the flexibility that e-learning can provide, making it an attractive option for management and tutors who see it as a way of catering more effectively for students in remote areas and students who want to take classes outside normal teaching hours.

These findings suggest that employment contracts for ITP tutors should include consideration of the flexibility required/permitted by incorporating e-learning in their teaching

- 8.2 Tutors in general were only moderately concerned that e-learning would give them **less direct control over their teaching**, although there was a slight trend towards seeing it as having an inhibiting effect. The e-learning managers' opinions on this factor ranged across the scale, with just over half of the 18 claiming that this was critically or very important, while just under half considered it to be of only moderate or little importance. In the case study institutions, management and most faculty agreed that a change to e-learning would involve a significant change in pedagogy, but the view that traditional methods of teaching and learning were becoming obsolete as new technology-rich ways of teaching are introduced was not universally held.

The challenges that e-learning pose to tutors' pedagogical philosophies and practices are manifold and should be addressed in systematic professional development programmes.

- 8.3 Tutors in general considered that the relevance of e-learning to their **subject areas** to be rather more facilitating than inhibiting. However, there was a strong indication that those who have not committed themselves to e-learning (i.e., Doubters and Refusers) saw it as not being appropriate to their subjects, whereas Embracers had no such qualms. The e-learning managers considered that tutors' perceptions of the relevance of e-learning to their subjects was of considerable importance in their decision to adopt this approach, this variable having one of the highest means. Management in the three case study institutions saw few problems in introducing e-learning, agreeing that it could be applied to almost all subjects. However, there was a greater variation of opinion among tutors.

Clearly, many tutors remain to be convinced that e-learning is a viable, even superior, alternative to more traditional approaches to teaching. For those who feel it does not suit their particular subject or field, exemplar programmes should be able to be accessed and analysed.

- 8.4 Tutors in general considered that the **pedagogical benefits** of e-learning was rather more facilitating than inhibiting. However, there was a strong positive relationship between tutors' levels of e-learning adoption and their ratings of its pedagogical benefits. In other words, Embracers were much more likely to perceive benefits than Doubters/Refusers. In a similar vein, e-learning managers considered that tutors' convictions as to the pedagogical benefits of e-learning played a very important role. Quality assurance was a major issue in all three case study institutions. Tutors particularly wanted to be assured that introducing e-learning would not detract from the quality of their courses.

These results suggest that further research needs to be carried out to demonstrate the (presumed) benefits of e-learning and that the results of existing research in this field should be disseminated.

- 8.5 Tutors in general considered the availability of **mentors** to be neither facilitating nor inhibiting, although the evidence suggests that mentors could well have played a significant role in facilitating Embracers adoption of e-learning and (possibly) their absence might have inhibited Doubters/Refusers. The e-learning managers gave a very high rating to the availability of mentors as influencing tutors' decisions to adopt e-learning, all 18 rating this factor as critically or very important. In all three case studies, the availability of peer support, guidance and advice, both from internal and external colleagues, was considered to be essential. Tutors were of the opinion that this sharing of experiences could provide them with models and examples, avoiding the trials and tribulations that occur when tutors introduce e-learning activities within their courses on their own.

These results suggest that professional development courses on e-learning should utilise the experiences of staff who have successfully incorporated this approach in their teaching. It also suggests that panels of experienced exponents of e-learning should be drawn up in each institution to provide assistance to staff who wish to incorporate e-learning into their courses.

- 8.6 Tutors considered their experiences of the **reliability of computer technology** to be neither facilitating nor inhibiting, but with a trend towards the former. A related factor, tutors' **tolerance of changes in computer software**, yielded a mean that indicated that they were equivocal about whether it was facilitating or inhibiting. However, there were differences of opinion within the sample, with Embracers rating it as facilitating and Refusers/Doubters as trending towards inhibiting.

This finding suggests the importance of carefully rolling out new technology in institutions and ensuring that it is adequately "de-bugged" before giving access to it by staff. Any new system will require careful introduction and technical support, especially in its early days.

9. Tutors' Personal Attributes

- 9.1 There were no **gender** differences in the levels of adoption of e-learning.
- 9.2 There appeared to be a relationship between **ethnicity** and level of adoption of e-learning, with Pakeha/Europeans and Asians having higher levels of adoption than Maori and Pacific Island tutors. For example, 58% of the Pakeha/Europeans identified themselves as Embracers or Modifiers, compared with 42% of Maori.

Further work needs to be done to explore any cultural barriers to the uptake of e-learning. For example, are Maori inhibited from adopting e-learning because it is seen to contravene their world view or because the courses they predominantly teach are considered to be inappropriate for conversion into an e-learning mode?

- 9.3 **Age** was not related to level of adoption of e-learning.
- 9.4 Tutors who taught **off-campus courses** were more likely to have higher levels of e-learning adoption than those teaching mainly on-campus.
- 9.5 Tutors in general considered their **technological competence** to be rather more facilitating than inhibiting, but with a moderately positive relationship between tutors' levels of e-learning adoption and their ratings of technological competence. In a similar vein, the e-learning managers rated tutors' technological literacy as a moderately to very important determinant of their decision to adopt e-learning, the mean rating placing it towards the middle of the 27 variables explored. In the case studies, all the tutors interviewed, even those who rated themselves as Embracers claimed that they would need to continually update and improve their technological skills. However, even those tutors who considered their skills to be only adequate, or less than adequate, did not see this as a barrier to implementing e-learning in their programmes.

In addressing this issue it is important to recognise that staff are spread across the whole spectrum of technological competence, ranging from those with no or minimal computer skills to those with high levels of such skills. It is probably most cost effective to place an emphasis on upgrading the skills of those with moderate proficiency.

- 9.6 Embracers indicated that their **openness to change in general** facilitated their adoption of e-learning, while Doubters/Refusers found it to be neither inhibiting nor facilitating. Likewise, tutors' openness to change was given one of the highest ratings by the e-learning managers as a determinant of tutors' decisions to adopt e-learning, with 15 of the 18 considering it to be critically or very important. In the case studies, most of the tutors claimed that they were already innovative in their teaching, often introducing and trying new methods and resources. They agreed that their motivation to try new systems is higher when the benefits of change are clearly articulated.

While openness to change is probably a deeply embedded personality trait, it must be recognised that most human beings are flexible and adaptable. The trigger point for change, however, will vary from individual to individual and a good manager will both recognise this and, accordingly, will adopt appropriate strategies to encourage staff to change.

10. Student Factors

- 10.1 The highest levels of adoption came from tutors in **courses** in which there would appear to be a perceived need for students to acquire skills in information and communication technologies in order to meet industry requirements (e.g., Business, Administration, Retail, Information Technology and Health). The lowest level of adoption occurred in those courses in which there would appear to be a greater emphasis on the acquisition of practical skills (e.g., Trades,

Engineering, Construction or Media Arts) or those with a focus on interpersonal communication (e.g., Social Services, Maori, Pasifica).

These findings pose a particular challenge to proponents of e-learning: how to demonstrate the utility of e-learning across a wide range of subjects. This can be addressed in a variety of ways, including demonstrating existing e-learning courses (or parts of courses) in, say the 'practical' subjects, making available relevant literature on such courses, and getting alongside staff who express an interest in developing such courses.

- 10.2 The e-learning managers expressed a range of views on the relative importance of **attracting new markets** as a driver of e-learning adoption, but generally rated it quite high. Ten of the 18 rated it as being critically or very important, the remaining 8 rating it as being only moderately important. In the case study interviews, management and faculty were aware of the ways that e-learning can create opportunities for extending the boundaries of courses in which they have a specialist advantage. They saw the flexibility that e-learning provides can attract mature students, students returning to the workforce and students in remote areas.

This could well be the most important driver for staff to incorporate e-learning in their teaching, for the vast majority of them are sensitive to and responsive to students' needs.

- 10.3 Tutors in general considered **students' access to computers** to be rather more facilitating than inhibiting, with a moderately positive relationship between tutors' levels of e-learning adoption and confidence that their students have ready access to computers. Given the ubiquitousness of computers, these results are unsurprising. Three questions in the e-learning managers' survey addressed students' ability to deal with e-learning – their ready access to computers, effective orientation to software, and technical support. All three received high ratings. Likewise, in the case studies faculty recognised that students face new challenges in e-environments and that in these environments students need to be able to use systems effectively, to be e-information-literate and be able to retrieve, store and use reliable and relevant information from the web. Faculty considered that many students lacked these and other skills. In most instances, this was because students lived in remote areas or because they were entering tertiary education from the workforce. In some cases, language and literacy skills were a barrier to using e-learning. Faculty claimed that many students had less experience with computers and fewer technological skills than was generally assumed by management and by tutors themselves.

While most of the preceding findings have focused on tutors, the other half of the teaching-learning equation is made up of students. Clearly, for e-learning to work, students' technological competence and access to appropriate technology must be high on the list of ITPs' priorities. This involves giving consideration to familiarising student with what is involved in e-learning, ensuring that e-learning courses are adjusted to the kinds of computer resources they can access and ensuring that they can access adequate technical support.

11. Conclusions

- 11.1 The central question of this study was what factors inhibit or facilitate ITP tutors' decisions to incorporate e-learning into their teaching? The briefest answer to this

question is that a complex array of factors comes into play in influencing the extent to which tutors adopt e-learning and that, depending on various circumstances, a particular factor may be seen as facilitating by some tutors and inhibiting by others.

- 11.2 There is wide diversity among tutors with regard to their levels of e-learning adoption. This has ramifications for planning and delivering professional development. Clearly, one size does not fit all. However, to reduce anxiety and to ensure consistency of tutor professional development there should be a limited number of software applications used within an institution. The adoption of an institutionally deployed learning management system could resolve this issue.
- 11.3 As with so many technological developments, it would seem that the majority of tutors, even the Embracers, are only scratching the surface of technology's potential. For an institution to continue to develop skills, strategies and techniques in e-learning, staff at all levels need to be continually exposed to applied research demonstrating successful, pedagogically sound emerging technologies in e-learning environments deployed in a range of disciplines.
- 11.4 There is wide diversity among ITPs in their commitment to and involvement in e-learning, with a few that are advanced and many that are only at the beginning stages. Institutions need to develop long-term policies and strategies that take account of rapidly shifting developments in technology and attendant pedagogy.
- 11.5 Institutions should recognize that expenditure in a reliable, robust and secure e-learning technical infrastructure is a critical investment in an increasingly competitive environment with heightened expectations from tutors, students and employers.
- 11.6 It is clear that the place of e-learning in ITPs (not to say other parts of the tertiary education sector) is going through a period of rapid development - and it shows every sign of continuing to do so. The findings of this study, then, are strictly time-bound.

12. Limitations of the Study

- 12.1 Although a 90% return rate was obtained from e-learning managers, the return rate from tutors was only 23.6%. While this rate is comparable to several other published studies, it clearly limits the extent to which the findings are true of the whole ITP sector.
- 12.2 Responses to the tutors' survey may be somewhat biased towards e-learning practitioners, but against that it should be noted that half the respondents were not involved in developing or delivering e-learning courses at the time of the survey.
- 12.3 There was a slight gender imbalance in the respondents to the tutors' survey, with females being overly represented compared with the national ITP gender ratio.

13. Implications for Further Research: Some Questions

- 13.1 Is the considerable investment of time that early adopters put into developing courses in the early days of e-learning still necessary, or has the increasing

availability of more sophisticated LMSs and technical infrastructure significantly reduced time requirements?

- 13.2 What is going to be the impact of likely/possible changes in technology on e-learning in the future? How can institutions prepare for inevitable change when its parameters, by definition, are largely unknown?
- 13.3 What expectations, skills and experiences relating to e-learning do students bring to tertiary education? How rapidly are these changing?
- 13.4 What do employers and professional bodies expect regarding e-learning provisions in the future? Are they currently using e-learning in training staff in-house? Will they be increasingly likely to do so in the future?
- 13.5 What are the key features of professional development programmes that take account of results of studies such as the present one? How can professional development programmes accommodate to the wide range of e-learning-related skills and attitudes of faculty and managers as portrayed in the findings of this study?

CHAPTER ONE

INTRODUCTION

In response to some of the objectives of the Tertiary Education Strategy 2002-2007 and the recommendations of subsequent strategies around ICT and e-learning, the Ministry of Education is administering the **Tertiary e-Learning Research Fund** to support the conduct of research into e-learning in the tertiary sector.

1.1 Project's Goals and Objectives

This report is the final report of the project, *Learning from Adopters and Resisters of E-Learning*, based at Waikato Institute of Technology, Hamilton, New Zealand. The main goal of this project was to investigate the factors that lead teaching staff in New Zealand Institutes of Technology/Polytechnics (ITPs) to adopt or resist the incorporation of e-learning approaches into their teaching practices.

The specific objectives of the project were:

1. To establish a database on the extent to which all New Zealand ITPs utilise e-learning in their teaching programmes.
2. To establish the critical factors that influence varying degrees of commitment by teaching staff to this approach.
3. To establish the relationship between institutional policies and on-the-ground realities with respect to e-learning.
4. To draw up a set of institutional guidelines based on findings from the preceding that will encourage greater adoption of e-learning in ITPs and, more widely, in the tertiary education sector.

The research utilised case studies, focus group interviews, document analyses, and two national surveys in order to establish the factors that facilitate or discourage tertiary teachers in their decisions to adopt e-learning.

1.2 Research Phases

The research had four main phases:

Phase 1

A literature search was conducted.

Reference

Mitchell, D., Barr, H., Bright, S. Clayton, J. and Gower, B. (2004a). *e-Learning: An annotated bibliography*. Report presented to Ministry of Education.

Phase 2

The managers of e-learning in all 20 ITPs were surveyed to determine their institution's e-learning policies and the extent to which e-learning had been adopted.

As well, an analysis of publicly available policy documents for each of the 20 ITPs was carried out.

Reference

Mitchell, D., Barr, H., Bright, S., Clayton, J. and Gower, B. (2004b). *Survey of e-learning managers in New Zealand Institutes of Technology and Polytechnics*. Report presented to Ministry of Education.

Phase 3

Case studies were conducted in three ITPs. In these, the following tasks were carried out: (a) an analysis of policy documents pertaining to e-learning, (b) interviews with key management personnel with roles in e-learning, and (c) focus group interviews with a range of tutors.

Reference

Barr, H, Clayton, J., Gower, B, Mitchell, D. and Bright, S. (2004). *Case studies of e-learning In three New Zealand Institutes Of Technology/ Polytechnics*. Report presented to Ministry of Education.

Phase 4

Teaching staff in all New Zealand ITPs were surveyed online to determine what factors influence their adoption or rejection of e-learning.

Mitchell, D., Clayton, J., Gower, B., Barr, H., and Bright, S (2005). *Survey of e-learning experiences of tutors in New Zealand Institutes of Technology/Polytechnics*. Report presented to Ministry of Education.

1.3 Review of the Literature

In preparation for this study, an extensive review of the literature was carried out (see Mitchell et al. (a), 2004). This took the form of an annotated bibliography. A thematic analysis of the literature will be presented in various sections of this report.

On the basis of the literature, an analytic model portraying the factors that impact on the adoption of e-learning by tertiary education faculty was developed to guide the conceptualisation of the project. Figure 1 presents this model. It shows that the level of adoption of e-learning by tertiary education faculty is determined, in the first instance, by their consideration of pedagogical aspects, their personal attributes and their perceptions of their students. In turn, these three factors are influenced by their institutions' cultures and policies. External influences impinge both on institutions and on faculty; in the latter case external influences may be either direct or mediated through institutional governance and management. It should be noted that this figure is a schematic portrayal only and omits such considerations as the bi-directional nature of influences that probably exist. For example, while faculty are influenced by institutional factors, they, in turn, influence the institution in which they work. Similarly, while external influences impinge on faculty, so too, do faculty have an impact on sources of external influence.

Figure 1: A model showing factors that influence faculty members' adoption of e-learning

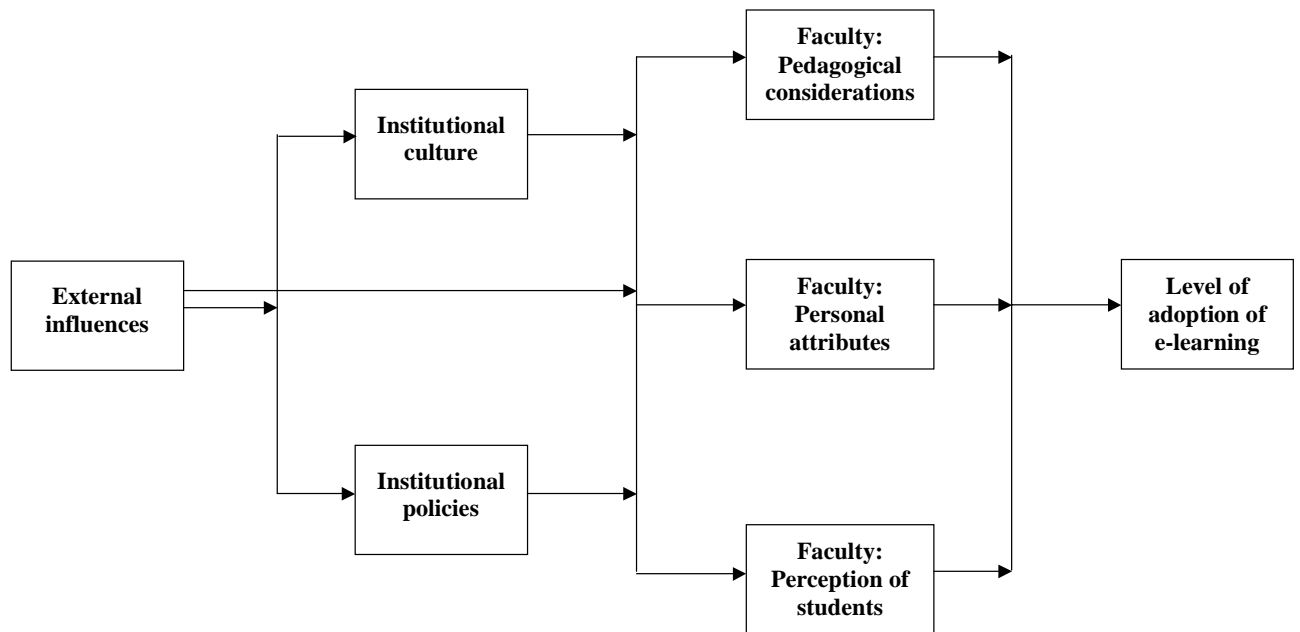


Table 1 portrays a more detailed classification of the variables that are summarised in Figure 1. A total of 34 independent variables were identified as having an impact on the dependent variable of adoption of e-learning. The shaded areas indicate variables that were selected for exploration in the project.

Figure 1. Classification of factors that impact on faculty members' adoption of e-learning (shaded areas indicate those studied in this survey)

External influences	Institutional		Faculty			35. Level of adoption of e-learning
	Culture	Policies	Pedagogical considerations	Personal attributes	Perceptions of students	
1. Employers' expectations	5. Supportive culture, values, atmosphere, change orientation	7. Development of long –term strategy	18. Increased flexibility	26. Feelings of adequacy in using technology	31. Recognition of students' motivations and interests	
2. Students' expectations	6. Acceptance of value, legitimacy of e-learning	8. Provision of professional development for faculty	19. Recognition of obsolescence of traditional teaching approaches	27. Predisposition to innovative behaviour, accepting challenges, develop new ideas, internal rewards	32. Recognition of students' expectations of increased access to e-learning	
3. Competition from other providers		9. Provision of time to develop courses	20. Appropriateness for subject area	28. Positive attitudes and beliefs about e-learning	33. Recognition of desirability of reaching new audiences	
4. Institutional reputation		10. Provision of time to deliver courses, workload adjustments	21. Assurance of quality outcomes	29. Opportunities to work in teams	34. Reliance on students' ability to deal with e-learning technology	
		11. Provision of financial resources for running costs	22. Enhancement of teaching and learning	30. Acceptance of different relationships with students		
		12. Provision of administrative support/pressure	23. Support from, and modelling by, peers			

		13. Provision of technical support	24. Belief that e-learning is at least as effective as traditional teaching			
		14. Provision of pedagogical support	25. Confidence in access to reliable technology			
		15. Negotiation of appropriate contracts, job security, workloads, consideration of time taken from research				
		16. Resolution of legal issues, eg intellectual property rights				
		17. Provision of recognition and rewards				

CHAPTER TWO

METHOD

The overall study comprised four major components. These, and their associated methods, are described below.

2.1 e-Learning Managers' Survey

This study involved an online survey of the e-learning managers, or their equivalent, in the 20 New Zealand Institutes of Technology/Polytechnics (ITPs) to determine their institution's e-learning policies and the extent to which e-learning has been adopted.

The questionnaire (which is available in the report of this component of the project) used a mix of checklists and 5-point Likert-type questions, covering the following areas:

- Management of e-learning
- Proportion of tutors with e-mail accounts
- Learning Management Systems in operation
- Rate of adoption by time, and by tutors' gender, age and type of appointment
- Management-level drivers of e-learning
- Factors influencing tutors' use of e-learning
- Barriers to the development of e-learning
- Planning for furthering e-learning.

A key aspect of this and the subsequent components of the project was a category system that addressed tutors' levels of adoption of e-learning. Briefly, five categories were identified:

- A. *Embracers*: advanced knowledge of e-learning/ thoroughly familiar with LMSs/use e-learning to transform teaching...
- B. *Modifiers*: understand e-learning tools and use selection of them/exploring LMSs/mainly focused on transmission of content...
- C. *Examiners*: limited grasp of e-learning, but considering its possibilities/ use low-threshold technology/exploring placing some material online...
- D. *Doubters*: know a little/ not actively exploring/satisfied with existing pedagogy...
- E. *Refusers*: not interested/ know little about e-learning/philosophically opposed...

See Figure 2 for a full description of these categories.

A total of 18 e-learning managers eventually responded to the survey, a 90 percent return rate.

Associated with this study, an analysis of publicly available policy documents for each of the 20 ITPs was carried out.

2.2 Case Studies

Case studies were conducted in three ITPs. In these, the following tasks were carried out: (a) an analysis of policy documents pertaining to e-learning, (b) interviews with key management personnel with roles in e-learning, and (c) focus group interviews with a range of tutors.

For the purposes of comparison, three disparate institutions were chosen, a large urban polytechnic and two smaller regional institutions. The two regional institutions serve regions quite different in character.

2.3 Policy Documents

In this aspect of the study, the web pages of the 20 ITPs were inspected to ascertain any references to e-learning policies. In the first instance we looked at publicly available charters, profiles, mission statements, values and goals. We found that 12 had publicly available charters and profiles. Information on the remaining 8 ITPs was obtained through the Ministry of Education. It is important to note that the charters and profiles are living documents and that the information obtained for this research constitutes to a “snapshot in time” during November 2004-April 2005.

The term *e-learning* is used in the majority of documents; however, the terms *mixed mode*, *flexible delivery*, *online delivery* and *blended delivery* are terms which are also used in the context of electronic delivery of, and access to, course materials and content.

In the remainder of this report, the e-learning-relevant content in the ITPs’ policy documents has been amalgamated, where appropriate, and analysed in relation to each of the 34 variables.

2.4 Tutors’ Survey

This study involved an online survey of tutors in the 20 New Zealand (ITPs).

The issues traversed were derived in part from reviewing the literature related to tertiary faculties’ acceptance of, or resistance to adopting e-learning in their teaching (Mitchell et al., 2004a). As well, the experiences of three of the research team (John Clayton, Beverley Gower and Stephen Bright), who had various e-learning responsibilities at Waikato Institute of Technology, were drawn upon and issues raised by e-learning managers in a previous survey (Mitchell et al., 2004b) were taken into account.

The questionnaire used a mix of checklists and 5-point Likert-type questions, covering the following areas:

- Levels of adoption of e-learning (see the five categories above).
- Characteristics of the sample (gender, ethnicity, age, subject area, location).
- The number of e-learning courses taught.
- The web-based technologies used and their value.
- Factors that inhibit or facilitate influencing tutors’ use of e-learning.

The questionnaire is included in the full report of this component of the study.

A total of 831 tutors eventually responded to the survey. This figure represented 23.6% of full-time tutors. This return rate is comparable to other large-scale surveys reported in the literature. For example, of 20 published medium- to large-scale surveys outlined in the report, *E-Learning: An Annotated Bibliography*, completed as part of this project, 6 had return rates of 26.5 or less and the average for all 20 studies was only 39%.

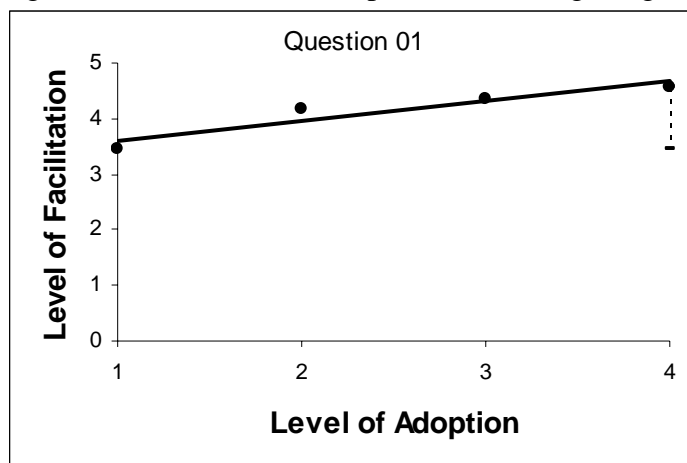
It will be helpful at this point to explain how data related to tutors’ perceptions of the extent to which various factors (30 in all) either facilitated or inhibited their adoption of e-learning and how these factors related to their levels of adoption of e-learning. This will be done by referring to a graph which is presented later in this report.

Figure 50 shows that Doubters/Refusers had a mean facilitation score of 3.50 (i.e., neither facilitating nor inhibiting) and the Embracers a mean facilitation score of 4.58 (i.e., facilitating). The ratings for the other two categories of e-learning adoption are plotted in the same manner and are portrayed in the Figure. From these data, a 'facilitation factor' was calculated by determining the difference between the means of the top and bottom groups: in this case $4.58 - 3.50 = 1.08$. In the graphs yielded by this method, the steeper the gradient, the greater the relationship between the level of facilitation and the degree of e-learning adoption. In other words, Embracers would be more likely to feel that the particular factor facilitates their use of e-learning in their teaching, whereas Doubters/Refusers would be more likely to feel that it inhibits their use of e-learning (all graphs followed this trend to a greater or lesser extent). Thus, in the example, the graph shows that Embracers generally found the factor to be facilitating, while Doubters/Refusers generally found it to be neither inhibiting nor facilitating. The facilitation factor of 1.08 suggests a moderately positive relationship between tutors' levels of e-learning adoption of e-learning and their ratings of their openness to change.

Conversely, the flatter the gradient, the less the relationship between levels of adoption and the factor's levels of facilitation.

The mean rating of this factor was 4.23, suggesting that, overall, the tutors considered that their openness to change facilitated their use of e-learning in their teaching. This was the highest mean for the 30 variables explored in the study

Figure 50. Effect of tutors' openness to change in general on their adoption of e-learning.



Mean for total sample: 4.23

Facilitation factor: 1.08

CHAPTER THREE

MAJOR FINDINGS: STATE OF THE ART OF E-LEARNING

3.1 Introduction

In this chapter, we provide an overview of the ‘state of the art’ of e-learning in New Zealand ITPs. In particular, data on the following will be presented: the management of e-learning; tutors’ levels of adoption of e-learning; the relationship between these levels and gender, age, ethnicity, employment status and subject areas; and tutors’ use of a range of Web-based teaching technologies. Findings from the e-learning managers’ survey and the tutors’ survey and relevant literature will be summarised. For more detailed information on these sources, the reader is referred to the separate reports produced by the project team.

3.2 Management of e-Learning

The e-learning managers were asked a series of questions about e-learning management, the proportion of staff with e-mail accounts, and the LMSs operating in their institutions.

From Table 2, it can be seen that e-learning is centrally managed in just under half of the institutions (44.4 percent), with another third opting for a model of devolved responsibilities within institution-wide integration.

<i>Management of e-learning</i>	<i>Number</i>	<i>%age</i>
Predominantly centralised	8	44.4
Devolved responsibilities within institution-wide integration	6	33.3
Devolved responsibilities with little or no institution-wide integration	0	0
Individual staff members’ initiative	2	11.1
Work planned, but not yet under way	2	11.2
No real work done in this area yet	0	0

Table 2. Management of e-learning.

Table 3 shows that in 90 percent of the ITPs, virtually all of the teaching staff had e-mail accounts (a factor that persuaded the research team to undertake an online survey of tutors in Phase 3 of the study).

<i>Proportion of tutors with e-mail accounts</i>	<i>Number</i>	<i>%age</i>
95-100%	16	88.9
90-94%	1	5.6
85-89%	1	5.6
less than 85%	0	0

Table 3. Proportion of tutors with e-mail accounts.

As can be seen in Table 4, on the basis of the evidence at the time of the survey (August 2004), the preferred LMS was Blackboard (44.4% of the ITPs), followed by Moodle (22.2

percent). However, with two respondents indicating an imminent move to Moodle, and the recent improvements in that system, it seems very likely that Moodle will become the preferred system in the near future.

<i>LMS operated</i>	<i>Number</i>	<i>%age</i>
WebCT	1	5.6
Blackboard	8	44.4
Moodle	4	22.2
Other*	5	27.8
None	0	0

* Other LMSs noted were: 'Janison Toolbox', 'utilise another provider' (otherwise unspecified), 'homegrown system, something like Moodle', 'locally developed system, but moving to Moodle for 2005', 'inhouse system scheduled for migration to Moodle in October 2004.'

Table 4. Learning Management Systems in operation.

3.3 Tutors' Levels of Adoption of e-Learning

Literature

The extent to which tertiary education faculty adopt e-learning lies at the heart of this project. Such an adoption is not an all-or-nothing phenomenon, but is best considered as a continuum, along which some progress rapidly, some slowly, and some not at all.

Without doubt, the most influential figure in understanding this process is Rogers (1995). In his seminal text on change theory, first published in 1962, Rogers described the nature and process of diffusion, the process by which an innovation is communicated through certain channels over time among members of a given social system. Rogers theorised that individual adoption rates of innovation are usually distributed along a bell-shaped curve and can be grouped under five categories: innovators, representing 2.5 percent of the population; early adopters, representing 13.5 percent; early majority, representing 34 percent; late majority, representing 34 percent, and laggards, representing 2.5 percent. According to Rogers, *innovators* tend to be venturesome, seeking out new ideas outside of their peer network. They are not always accepted within their own social network, but play an important role, introducing new ideas and innovations into their systems. He points out that research suggests that innovativeness is positively related to years of formal education, literacy, social status, empathy, ability to deal with abstractions, rationality, intelligence, a favourable attitude towards change, a favourable attitude towards science, high aspirations, social participation, social connectedness outside of own system, change agent contact, mass media exposure, information seeking behaviour, knowledge about the innovation, and opinion leadership. Innovativeness is negatively related to dogmatism and fatalism. *Early adopters* are often more respected in their system, and serve as opinion leaders, introducing potential adopters to the innovation. *The early majority* accepts the innovation sooner than the average member of the system does. They deliberate longer about the appropriateness of adopting an innovation, and seldom lead. *The late majority* tends to be sceptical about innovations, and accept an innovation only when most of the system has done so. They do not like uncertainty. *Laggards* are traditionalists, whose main point of reference is the past. They are suspicious of innovations and change agents.

Geoghegan (1994) applied Rogers' diffusion of innovation model to the question of faculty involvement in and participation with instructional technology. He described the *innovators*, who make up no more than 3 percent of faculty, as tending to be the campus 'techies' who are intrigued by new developments in hardware and software and are able to use the technology independent of any institutional assistance or support. The *early adopters*, making up about 10 percent of the population, are viewed as the 'visionaries' who combine an interest in using new technologies with a desire to incorporate them into their teaching. This group is also quite self-sufficient in the use and application of technology. The majority of the population, about 70 percent, can be divided into the *early majority* and the *late majority*. The early majority are the pragmatists who are receptive to new technologies but are only willing to use them if they are proven to be reliable means for improving teaching and learning. The late majority are the skeptics who are less receptive to new technologies and who must be convinced, and maybe even coerced, to actually employ the new technologies. The *laggards* are those who have absolutely no interest in using new instructional technologies and who may also launch the strongest opposition to any changes in educational delivery modes. The widest 'chasm' in the distribution from innovators to laggards, according to Geoghegan (1994), is the transition from the early adopters to the early majority. This gap represents the point where many colleges and universities currently find themselves, and is so significant in the case of instructional technology that it has so far stymied almost all efforts to bridge it.

Yet another interpretation of Rogers's (1995) model is offered by Zemsky & Massy (2004). They refer to an 'Innovation's S-Curve' in which e-learning's pattern of innovation, change, and adoption follows the classic S-curve. In this process, they claim, adoption usually starts slowly because of the need for experimentation, it accelerates once the dominant design emerges, and then eventually reaches saturation. Along the lines of Rogers (1995), Zemsky & Massy note that actors can be characterised in the following way: *The innovators*, who represent the first few percent of the eventual user population, seek out and experiment with new ideas—often driven by an intrinsic interest. *The early adopters*, roughly the next 15 percent of users, are moved to adopt once the innovators have proven the concept. They usually are tightly connected to others in the field and often are viewed as opinion leaders. Early adopters seldom consider themselves to be pioneers, but rather as hardheaded decision-makers who pursue the innovation for extrinsic rather than intrinsic reasons. But because they participate in the fluid stage of adoption, before the dominant design has become established, they shoulder substantial risk. *The early majority*, roughly the next third of the population of eventual users, enters after the dominant design is established. They display less leadership than the early adopters but are open to new ideas and tend to be well respected by their peers. They want to stay ahead of the curve, and in so doing they drive the first big wave of market expansion. *The late majority*, the next third of the population of eventual users, comprises people who adopt after half the population has already done so. They are followers, either due to their conservatism or because their attention was focused elsewhere during the earlier adoption stages. Late-majority users drive the next wave of market expansion, which is characterised by intense competition as the innovation matures. *The diehards*, the last 15 percent or so, resist adopting the innovation despite its now-obvious advantages and the risk of becoming isolated. In the end, of course, according to Zemsky & Massy, the diehards die or retire from the field.

Hagner & Schneebeck (2001) offer what they claim to be a simplified version of Rogers's (1995) adopter classification categories. After intensive interviews with faculty at a US university, they found that the faculty demonstrated predominant characteristics of one of four groups: *The entrepreneurs* have a high level of commitment to quality teaching and learning and an informed competency with the new teaching and learning technologies. Their work

tends to be idiosyncratic and not portable to other faculty, and they are content to use their expertise to solve their own instructional problems. *The risk averters* have one or more of the following characteristics: they lack technical expertise, are unsure of the investment costs associated with transformation, are afraid that their current success in teaching will not translate into the new teaching environments, need significant levels of instructional support to make the transformation, and want to focus on teaching and learning not on the technology. *The reward seekers'* motivations are closely tied to the universities' reward structures. When they see that the adoption of new teaching and learning technologies has a positive impact on tenure, promotion and salary decisions, they will be more willing to transform. The fourth group, *the reluctant*s, includes those who are computer illiterate or firmly believe that traditional models of learning are superior. The authors say that studies have shown that it is neither cost effective nor time effective to attempt to incorporate such philosophically resistant faculty into institutional transformation.

In a similar vein to the above, but departing somewhat from Rogers's model, Redman & Kotrlik (2004) described a four-stage technology adoption model, based on earlier work by Sandholtz et al. (1997) and Russell (1995). In the first stage, *exploration*, faculty seek to learn about technology and how to use it. In the second stage, *experimentation*, faculty focus more on using technology in instruction by presenting information using presentation software and employing a few instructional exercises using spreadsheets, databases, word processors, games, simulations, the Internet, and/or other technology tools. The next stage, *adoption*, sees technology becoming a focal point. Instructors employ presentation software and technology-based instructional exercises using games, simulations, spreadsheets, databases, word processors, the Internet or other technology tools as a regular and normal feature of instructional activities. Student-shared responsibility for learning emerges as a major instructional theme. In the fourth stage, *advanced integration*, faculty pursue innovative ways to use technology to improve learning. Students take on new challenges beyond traditional assignments and activities and use technology to collaborate with others from various disciplines to gather and analyse information for student learning projects.

In the present study, we took account of the above conceptualisations and developed a classification with five groups, according to the extent to which faculty incorporated e-learning in their teaching:

- A. *Embracers*: advanced knowledge of e-learning/thoroughly familiar with LMSs/use e-learning to transform teaching...
- B. *Modifiers*: understand e-learning tools and use selection of them/exploring LMSs/mainly focused on transmission of content...
- C. *Examiners*: limited grasp of e-learning, but considering its possibilities/ use low-threshold technology/exploring placing some material online...
- D. *Doubters*: know a little/not actively exploring/ satisfied with existing pedagogy...
- E. *Refusers*: not interested/know little about e-learning/ philosophically opposed...

Figure 2 presents a detailed description of these categories, which were employed in all phases of the research project.

Figure 2. Classification of tutors' according to their utilisation of e-learning.

In terms of the utilisation of e-learning in teaching, we think that tutors fall into five main groups. Which group do you consider you belong to? In making this judgement, take account of the various descriptions and decide into which group you best fit. It is not necessary that all the descriptions in your group will apply to you, but most should.

Group A Group B Group C Group D Group E

Group A

- I have an advanced knowledge of e-learning methods and I use them to the fullest capacity.
- I have developed one or more courses that are designed specifically to make effective use of online tools.
- I am thoroughly familiar with such Learning Management Systems as Blackboard, WebCT and Moodle and use them in one or more courses. I am committed to continuous innovation via technology.
- I use e-learning to *transform* my teaching as much as possible. For example, I use computers to establish 'virtual learning communities' where knowledge, ideas and perspectives can be freely shared and analysed.
- I use computers to provide maximum opportunities for dialogue with my students and among my students (eg, through on-line discussion groups, chat groups, as well as through e-mail).
- I actively encourage my students to engage in web-based research, which may go beyond the prescribed course.

Group B

- I have an understanding of e-learning tools and teaching strategies and I use a selection of them in my teaching.
- I have developed one or more courses that contain some online features. I am aware of such Learning Management Systems as Blackboard, WebCT and Moodle and am beginning to explore them.
- I mainly use e-learning as an aid or supplement to my normal face-to-face teaching. I am committed to maintaining the value of traditional approaches, but am open to carefully thought-through technological improvements to the model.
- I use computers largely as a means of *transmitting* the content that I normally deliver in face-to-face classes. For example, I often provide access to online lecture notes and reading lists. I often have regular e-mail communication with individual students, but not to the point of setting up on-line discussion groups.
- I refer my students to Web-based sources in order to supplement reading lists.

Group C

- I have a limited grasp of e-learning, but am considering its possibilities.
- I am interested in exploring, discussing and questioning e-learning as a new way of teaching but am hesitant to commit myself to it at this stage.
- I am beginning to incorporate 'low-threshold technology'. For example, I occasionally use e-mail as a means of communicating with individual students and I have already placed some of my course materials online or I am exploring this idea.
- I make occasional reference to web-based sources.

Group D

- I know a little about e-learning but I am not actively exploring it for my own teaching.
- I generally consider that the benefits of face-to-face teaching cannot be replaced or replicated by e-learning.
- I believe that my subject area does not lend itself to e-learning.
- I feel competent with my existing pedagogy and do not want to have to rebuild it to accommodate e-learning technology.
- Very occasionally, I use e-mail to respond to students' queries.

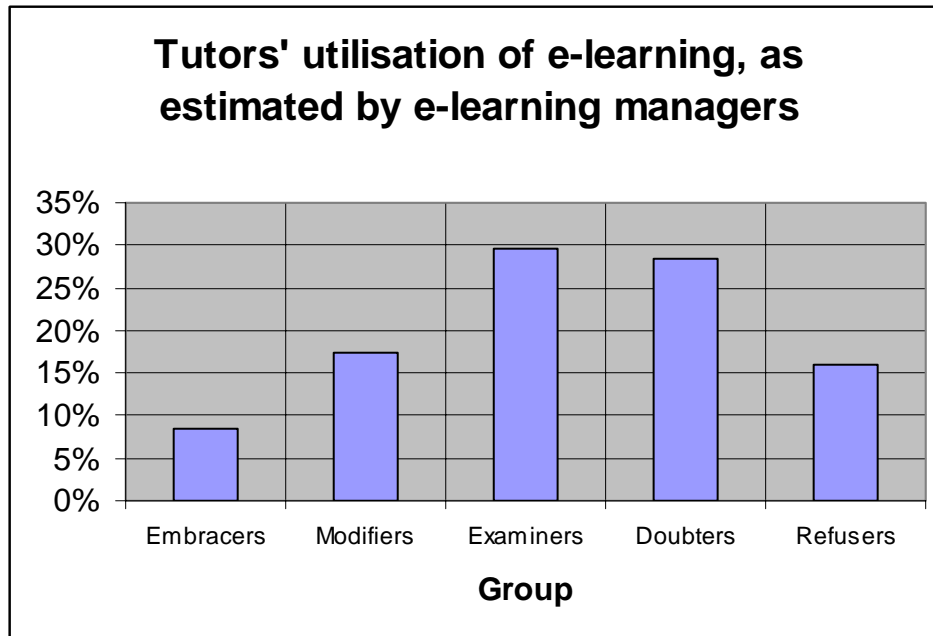
Group E

- I am not interested in e-learning.
- I know little, if anything, about e-learning.
- I am actively opposed to e-learning on philosophical grounds.
- I consider e-learning to be completely irrelevant to my activities.
- I refuse to adopt e-learning tools until the effort is institutionally rewarded or until time allowances are made.
- I have very limited skills in using computer technology.

Managers' Survey

From Figure 3 it can be seen that the e-learning managers' estimates of tutors' utilisation of e-learning in their institutions varied widely. On average, 9% of staff were considered to be embracers, 17% modifiers, 30% examiners, 29% doubters and 16% refusers.

Figure 3. Tutors' utilisation of e-learning.



It should be noted that in responding to this set of questions, several of the e-learning managers felt they had insufficient information to make an accurate estimate. Two felt sufficiently strongly about this that they asked for their responses not to be considered. Thus, Figure 3 refers to only 16 of the 18 in the sample. Further, it must also be noted that there was considerable variation in the estimates among the respondents. For example, one respondent estimated the following distribution: A: 50%, B: 30%, C: 10%, D: 5%, and E: 5%, while another respondent's estimates were almost the mirror image: A: 0%, B: 5%, C: 10%, D: 50%, and E: 35%. While this may well represent the differences between levels of adoption of e-learning in different ITPs, it may also reflect the lack of robustness in the scale and problems in making estimates on the basis of limited information. The data represented in Figure 3, therefore, should be interpreted cautiously.

Tutors' Survey

Tutors were asked to classify their degree of adoption of e-learning according to the five categories outlined above.

From Table 5 it can be seen that the respondents were spread across the spectrum of e-learning adoption. A majority (58%) of the tutors surveyed were engaged in e-learning activities as either Modifiers or Embracers. An additional number (33%) expressed a willingness to explore the benefits of e-learning further. Because the number of Refusers was very small, they were combined with Doubters to make one group for the purposes of subsequent analyses.

<i>Level of Adoption</i>	<i>N</i>	<i>%age of sample</i>
Embracers	96	11.9
Modifiers	368	45.5
Examiners	271	33.5
Doubters	72	8.9
Refusers	2	0.2
Total	809	100.0

Table 5. Distribution of sample by level of adoption of e-learning.

Table 6 presents a more detailed breakdown on the levels of adoption of e-learning across all 20 ITPs. In calculating means in this and subsequent tables, Embracers were allocated a score of 5, Modifiers a 4, and so on. Thus, the higher the mean, the ‘higher’ the level of adoption of e-learning. Scores for 3 ITPs were excluded because of the very low response rates.

From Table 6 it can be seen that a majority (12) of institutions had mean tutor ratings of 3.5 or above, with a minority (5) recording mean tutor ratings less than 3.5. There was a trend for tutors in larger institutions to have higher levels of e-learning adoption than those in smaller institutions, with means of 3.7 and 3.2, respectively.

ITP	Group					Mean
	Embracers	Modifiers	Examiners	Doubters	Refusers	
<i>ITPs with fewer than 200 staff</i>						
1	1	0	2	0	0	N/A
2	0	0	1	0	0	N/A
3	0	1	0	0	0	N/A
4	3	3	3	3	0	3.7
5	0	15	19	5	0	3.3
6	4	7	21	1	0	3.4
7	1	13	11	2	0	3.5
8	6	26	31	6	0	3.5
9	2	11	21	7	1	3.1
10	0	7	7	3	0	3.2
11	15	35	11	2	0	4.0
12	3	16	11	4	0	3.5
13	6	34	31	6	0	3.5
14	4	11	9	1	0	3.7
15	2	6	11	0	0	3.5
<i>ITPs with more than 200 staff</i>						
16	6	53	19	11	0	3.6
17	9	36	30	15	0	3.4
18	9	27	13	2	1	3.8
19	10	26	10	2	0	3.9
20	14	41	6	2	0	4.1
Total	96	368	267	72	2	3.6

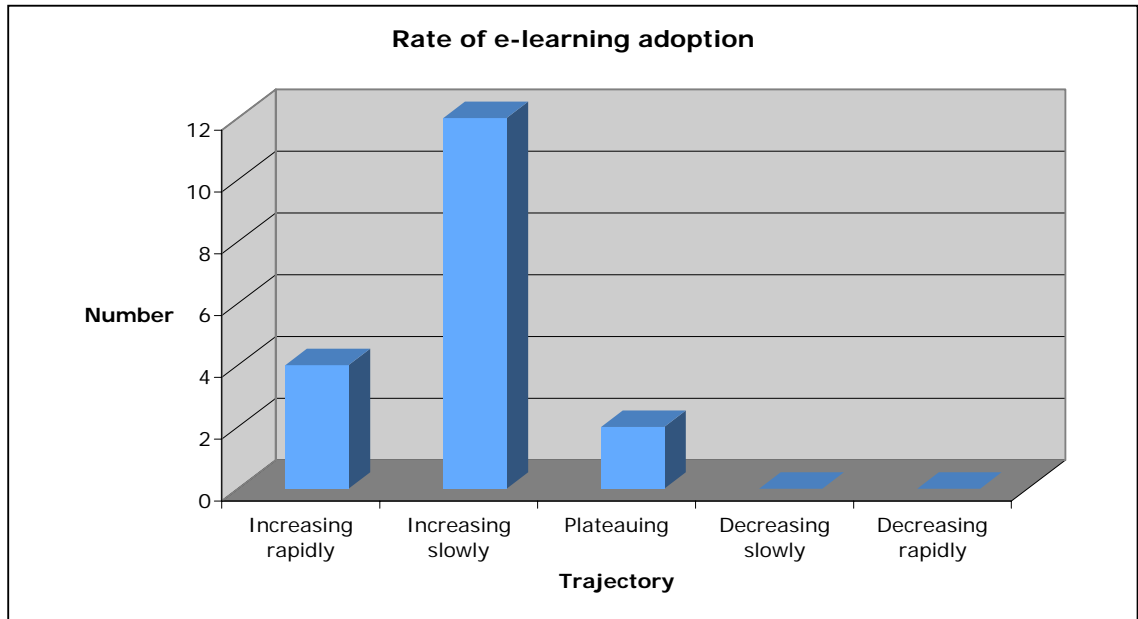
Table 6. Distribution of sample by level of adoption of e-learning and ITP.

3.4 Tutors' Rates of Adoption of e-Learning Over Time

Managers' Survey

The e-learning managers were asked to give their opinions as to the rate of growth of e-learning adoption in their respective ITPs. As can be seen in Figure 4, the bulk of the 18 respondents considered that e-learning adoption was increasing, rapidly in the case of 4 and slowly in the case of 12. Two considered that it was plateauing, while none thought that it was decreasing.

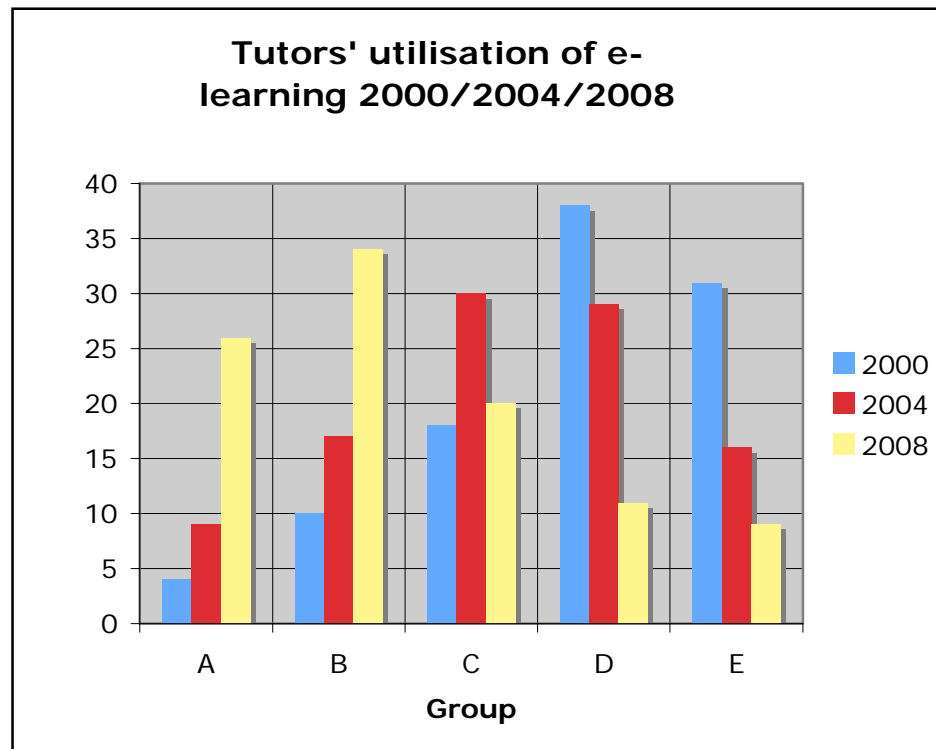
Figure 4. Rate of tutors' adoption of e-learning.



The above results were further refined in another set of questions in which the respondents were asked to estimate the distribution of tutors across the five categories of utilisation of e-learning currently (2004), earlier (2000) and anticipated (2008).

Even bearing the above cautions in mind, it is apparent that the e-learning managers have noted considerable increases in Groups A and B from 2000 to 2004 and that they anticipate even greater increases in those categories for the next four years. The reciprocal also applies, with marked decreases in Groups D and E between 2000 and 2004 and into the future.

Figure 5. e-Learning managers' estimates of tutors' utilisation of e-learning 2000-2008.



In conclusion, it is clear that most e-learning managers consider that tutors are not only increasing their utilisation of e-learning in their teaching, but that they are becoming more sophisticated in their application of e-learning strategies.

3.5 Levels of Adoption of e-Learning by Gender, Age, Employment Status, Ethnicity, and Subject Areas

Managers' Survey

Within the limitations referred to above, the information from the e-learning managers suggested that there were no grounds to think that, in general, gender or age are significant variables in determining the extent to which e-learning is adopted, although there may be some inter-institutional variation. There was some indication of a trend towards tutors holding full-time appointments being more likely to be 'higher' up the scale of adoption. The e-learning managers were not questioned about the relationships between tutors' adoption of e-learning and their ethnicity, and subject areas.

Tutors' Survey

Subject areas. Table 7 presents data on the distribution of sample by the tutors' *subject areas* and their levels of adoption of e-learning. The highest levels of adoption came from tutors in courses in which there would appear to be a perceived need for students to acquire skills in information and communication technologies in order to meet industry requirements (e.g., Business, Administration, Retail, Information Technology and Health).

The lowest level of adoption occurred in those courses in which there would appear to be a greater emphasis on the acquisition of practical skills (e.g., Trades, Engineering, Construction or Media Arts) or those with a focus on interpersonal communication (e.g., Social Services, Maori, Pasifika).

<i>Subject area</i>	<i>Group</i>					<i>Mean</i>
	<i>Embracers</i>	<i>Modifiers</i>	<i>Examiners</i>	<i>Doubters</i>	<i>Refusers</i>	
Business, Administration, Retail	18 (13.4%)	73 (54.5%)	36 (26.9%)	7 (5.2%)	0 (0.0%)	3.8
Education	8 (11.4%)	30 (42.9%)	25 (35.7%)	7 (10.0%)	0 (0.0%)	3.6
Health	9 (7.7%)	66 (56.4%)	39 (33.3%)	3 (2.6%)	0 (0.0%)	3.7
Information Technology	28 (23.1%)	72 (59.5%)	20 (16.5%)	1 (0.8%)	0 (0.0%)	4.1
Maori, Pasifica	0 (0.0%)	4 (17.4%)	14 (60.9%)	5 (21.7%)	0 (0.0%)	3.0
Media Arts	7 (13.2%)	23 (43.4%)	19 (35.8%)	4 (7.5%)	0 (0.0%)	3.6
Science, Primary Industries	5 (8.9%)	20 (35.7%)	24 (42.9%)	7 (12.5%)	0 (0.0%)	3.4
Social Services	1 (3.6%)	6 (21.4%)	15 (53.6%)	6 (21.4%)	0 (0.0%)	3.1
Sports, Exercise, Recreation	1 (5.6%)	10 (55.6%)	4 (22.2%)	3 (16.7%)	0 (0.0%)	3.5
Trades, Engineering, Constr	1 (1.6%)	19 (29.7%)	28 (43.8%)	14 (21.9%)	2 (3.1%)	3.1
Other	18 (15.4%)	39 (33.3%)	45 (38.5%)	15 (12.8%)	0 (0.0%)	3.5
TOTAL	96 (12.0%)	362 (45.2%)	269 (33.6%)	72 (9.0%)	2 (0.2%)	3.6

Note: of the 22 participants who did not indicate their level of adoption, 17 were located in Trades, Engineering, Construction, 1 was in Information Technology, 2 were in Business, Administration, Retail, and 1 in Media Arts.

Table 7. Distribution of sample by subject area and level of adoption of e-learning.

Gender. There were no gender differences in the levels of adoption of e-learning (Table 8).

<i>Gender</i>	<i>Group</i>					<i>Mean</i>
	<i>Embracers</i>	<i>Modifiers</i>	<i>Examiners</i>	<i>Doubters</i>	<i>Refusers</i>	
Male	48 (13.7%)	155 (44.2%)	107 (30.5%)	39 (11.1%)	2 (0.6%)	3.6
Female	48 (10.7%)	211 (46.9%)	159 (35.3%)	32 (7.1%)	0 (0.0%)	3.6
Total	96 (12.0%)	366 (45.7%)	266 (33.2%)	71 (8.9%)	2 (0.2%)	3.6

Table 8. Distribution of sample by gender and level of adoption of e-learning.

Ethnicity. There appears to be a relationship between ethnicity and level of adoption of e-learning, with Pakeha/Europeans (Mean 3.6) and Asians (Mean 3.7) having higher levels of adoption than Maori (Mean 3.3) and Pacific Island (Mean 3.4) respondents (Table 9). For example, 58% of the Pakeha/Europeans identified themselves as Embracers or Modifiers, compared with 42% of Maori.

<i>Ethnicity</i>	<i>Group</i>					<i>Mean</i>
	<i>Embracers</i>	<i>Modifiers</i>	<i>Examiners</i>	<i>Doubters</i>	<i>Refusers</i>	
Maori	5 (7.5%)	23 (34.8%)	26 (39.4%)	12 (18.2%)	0 (0.0%)	3.3
Pakeha/European	75 (12%)	290 (46.3%)	209 (33.4%)	51 (8.1%)	1 (0.2%)	3.6
Pacific Island	1 (5.3%)	6 (31.6%)	12 (63.2%)	0 (0.0%)	0 (0.0%)	3.4
Asian	2 (11.1%)	11 (61.1%)	3 (16.7%)	2 (11.1%)	0 (0.0%)	3.7
Other/unspecified	10 (14.5%)	35 (50.7%)	17 (24.6%)	6 (8.7%)	1 (1.4%)	3.7
Total	93 (11.7%)	365 (45.7%)	267 (33.5%)	71 (8.9%)	2 (0.3%)	3.6

Table 9. Distribution of sample by ethnicity and level of adoption of e-learning.

Age. Age appears not to be related to level of adoption of e-learning, with the means for each age group being very similar (Table 10).

<i>Age</i>	<i>Group</i>					<i>Mean</i>
	<i>Embracers</i>	<i>Modifiers</i>	<i>Examiners</i>	<i>Doubters</i>	<i>Refusers</i>	
20-29	4 (12.1%)	16 (48.5%)	11 (33.3%)	2 (6.1%)	0 (0.0%)	3.7
30-39	13 (8.2%)	80 (50.3%)	55 (34.6%)	11 (6.9%)	0 (0.0%)	3.6
40-49	35 (13.3%)	114 (43.2%)	92 (34.8%)	22 (8.3%)	1 (0.4%)	3.6
50-59	36 (14.1%)	117 (45.7%)	79 (30.9%)	23 (9.0%)	1 (0.4%)	3.6
60+	6 (7.9%)	34 (44.7%)	24 (31.6%)	12 (15.8%)	0 (0.0%)	3.5
Total	94 (12.2%)	361 (45.8%)	261 (33.1%)	70 (8.9%)	2 (0.3%)	3.6

Table 10. Distribution of sample by age and level of adoption of e-learning.

Location of students. Not surprisingly, as shown in Table 11, tutors who taught off-campus (Mean 3.9) were more likely to have higher levels e-learning adoption than those teaching mainly on-campus (Mean 3.5). For example, 72% of the former rated themselves as Embracers or Modifiers, compared with 54.5% of the latter. This difference probably arises because off-campus teaching is much more likely to involve some form of distance or flexible methodology.

<i>Location of students</i>	<i>Group</i>					<i>Mean</i>
	<i>Embracers</i>	<i>Modifiers</i>	<i>Examiners</i>	<i>Doubters</i>	<i>Refusers</i>	
Mainly on-campus	52 (8.5%)	281 (46.0%)	217 (35.5%)	59 (9.7%)	2 (0.3%)	3.5
Mainly off-campus	28 (24.6%)	54 (47.4%)	25 (21.9%)	7 (6.1%)	0 (0.0%)	3.9
Even split	14 (19.7%)	32 (45.1%)	25 (35.2%)	0 (0.0%)	0 (0.0%)	3.9
Total	94 (11.8%)	367 (46.1%)	267 (33.5%)	66 (8.3%)	2 (0.3%)	3.6

Table 11. Distribution of sample by location of students and level of adoption of e-learning.

3.6 Tutors' Use of Web-based Teaching Technologies

The data in this section are based on the tutors' responses to Question 8, 'Could you please indicate with an X which of the following Web-based teaching technologies you use in your teaching. For each one you actually use, please rate its value to you and your students as a learning tool.'

The nominated technologies were grouped into four major categories:

1. Communication tools: items involving tutor-student, student-tutor or student-student communication.
2. Presentation tools: items involving the presentation, storage, and management of course materials.
3. Assessment and administrative tools.
4. Integrated e-learning technologies.

1.1 Communication tools

A key feature of e-learning is that it facilitates communication between faculty and students and among students. In this section, we will examine tutors' use of Web-based technologies to facilitate one-to-one communication, one-to-many communication, and many-to-many communication.

1.1.1 One-to-one communication tools

From Figure 7, it can be seen that, overall, a significant majority of tutors reported using personal e-mail, a relatively new technology, in their teaching practice while telephone support, a traditional technology, was less used (Figure 8). It could be argued that the use of e-mail is more highly valued as it is not reliant on time or place, while the telephone is a somewhat haphazard form of connectivity.

There was a clear trend towards Embracers and Modifiers finding *both* e-mail and telephone support more valuable than Examiners and Doubters/Refusers in their teaching. This might suggest that Embracers and Modifiers are more 'tuned in' to communicating with their students, irrespective of the medium.

Figure 7. Use of personal e-mail in teaching.

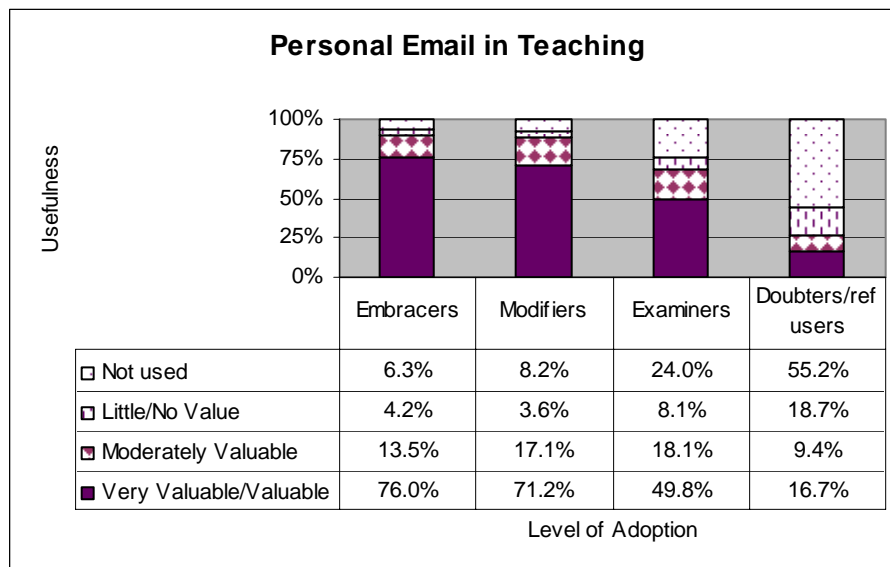
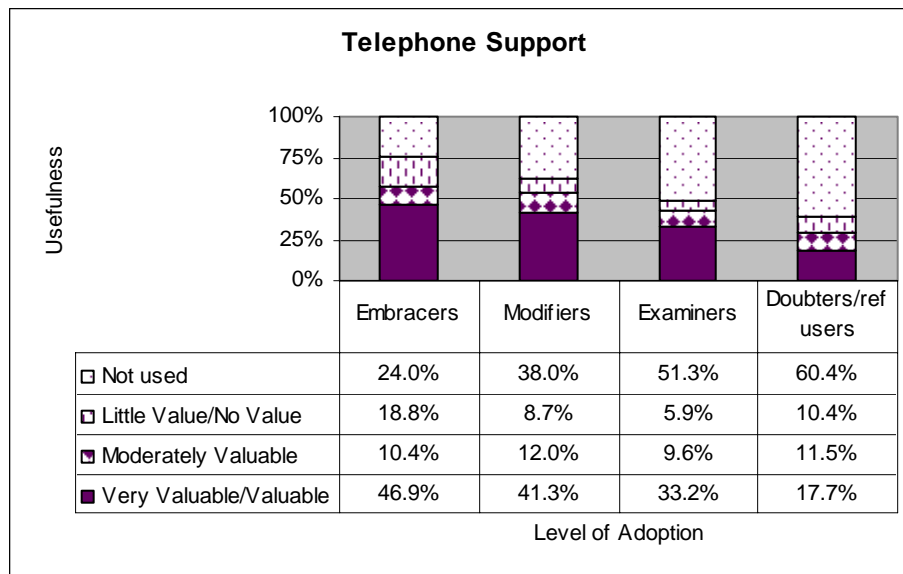


Figure 8. Use of telephone support in teaching.



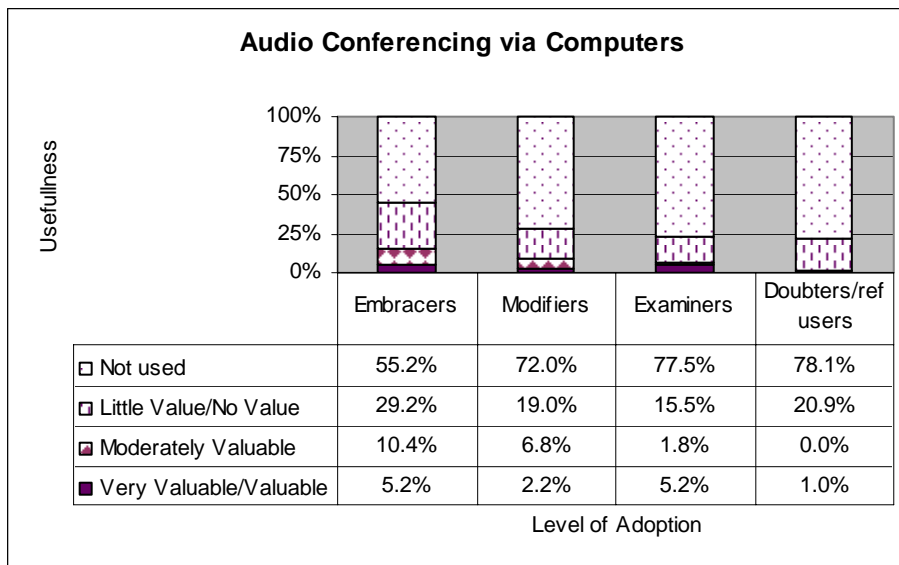
1.1.2 One-to-many communication tools

e-Learning technologies enable a student or a tutor to communicate simultaneously to many recipients via audio conferencing, moderated and unmoderated e-mail discussion groups, discussion fora ('forums'), and video conferencing.

Audio conferencing. As indicated in Figure 9, audio conferencing via computers (sometimes referred to as 'voice over internet protocols') was little used by the respondents in general. Of those who did employ this approach, most found it to be of little or no value. Embracers were more likely to use it than the other groups, but even then only 45% of them employed it.

These results might reflect tutors' awareness of the number of issues involved in the use of sophisticated e-learning tools. Firstly, the limited internet capacity of many participants' computers limits the use of these tools to those who have access to fairly robust high broadband networks. Secondly, the complex nature of the e-tools requires a highly technically literate participant to operate them successfully. Thirdly, participants' computers may not have the necessary hardware, such as a graphics card, and the processing speed for the tools to function.

Figure 9. Use of audio conferencing via computers.



e-mail discussion groups. Figures 10 and 11 show that e-mail discussion groups were not widely used, except among those who categorised themselves as Embracers, where just over half employed the approach and mostly found it to be valuable. In contrast, only one-quarter of Doubters and Refusers used e-mail discussion groups and, of those who did, the vast majority considered it to be of little value.

It would seem, then, that while tutors recognised the value of e-mail as a communication tool on a personal and private level they have generally not expanded upon this practice. Possibly this is because the increased number of e-mails received during e-mail moderated discussion, and the resultant increase in tutors' workloads generated by managing and responding to these e-mails, acts as a deterrent.

Figure 10. Use of moderated e-mail discussion groups (full class).

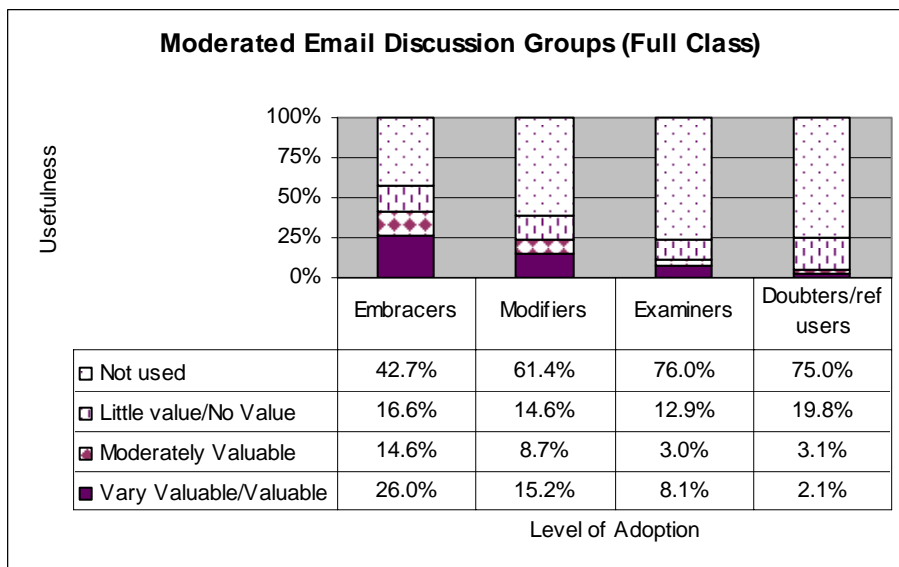
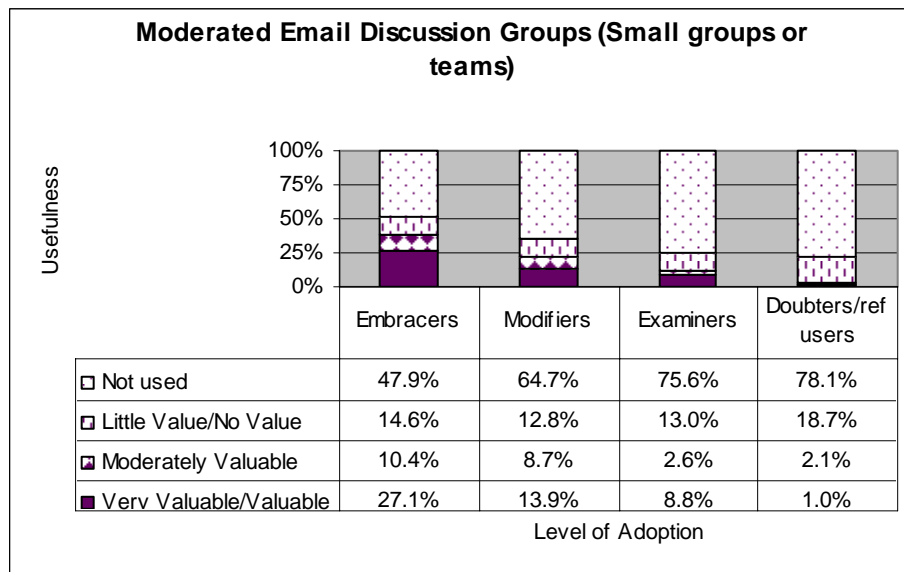


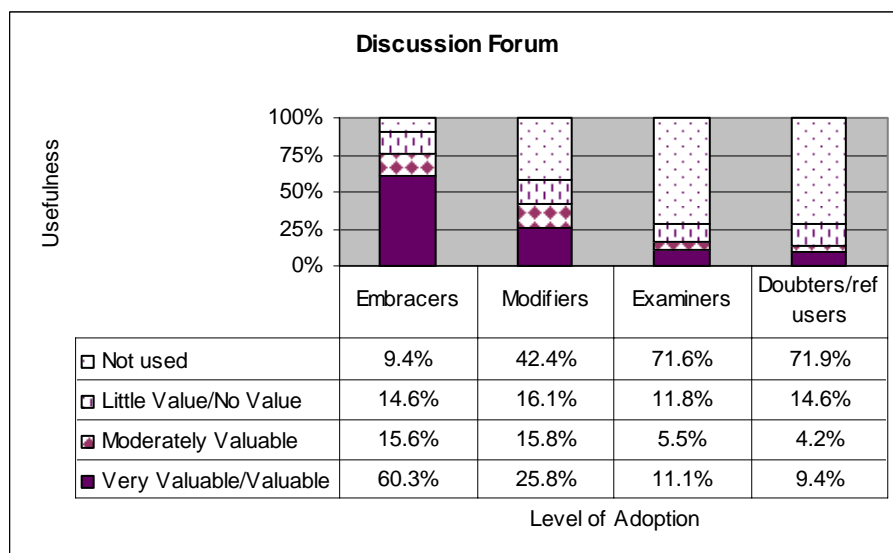
Figure 11. Use of moderated e-mail discussion groups (small groups or teams).



Discussion fora. The use of discussion fora showed wide variation among the respondents, with 90% of Embracers using them, the vast majority of whom rating them as being valuable or very valuable (see Figure 12). In contrast, fewer than 30% of the Examiners, Doubters and Refusers used discussion fora in their teaching, of whom only about half found them of any value.

Since discussion fora are embedded in learning management systems, it could be that a significant majority of Doubters/Refusers have not accessed or used such systems. It would appear that there is correlation between exposure to the tools of a learning management system and the use of new e-learning techniques and technologies such as discussion fora.

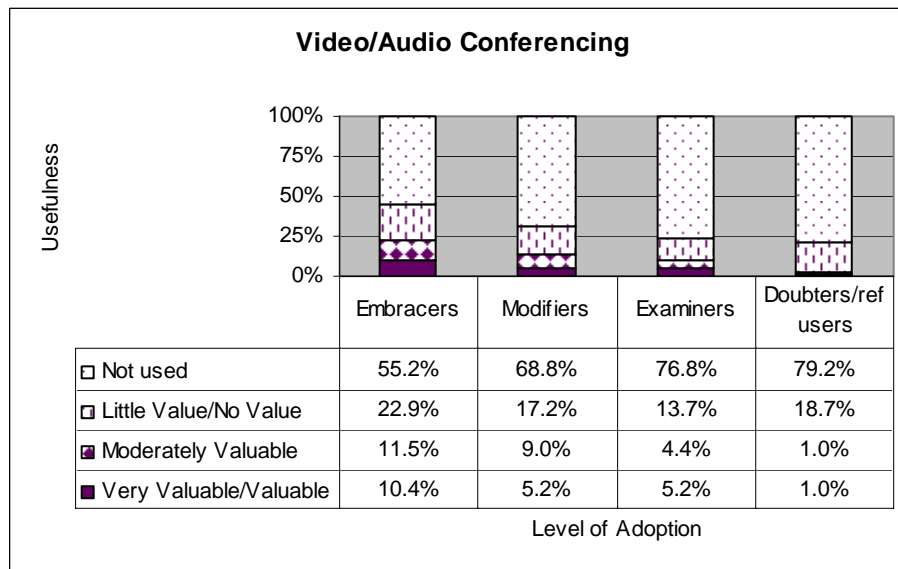
Figure 12. Use of discussion fora.



Video/audio conferencing. As can be seen in Figure 13, fewer than half the tutors used video/audio conferencing. Even among the Embracers, only 45% used this approach in their teaching. Of those who did employ it, few found it valuable or very valuable. For example, only 10% of Embracers gave it high marks.

Possible explanations of this low uptake revolve around the fact that video and audio conferencing is a synchronous e-tool that is based on time and, in the case of video conferencing, place. The use of these e-tools assumes that all participants will be available at a specific time, and in the case of video conferencing, where delivery and reception hardware is required, they are further constricted to be in a specific place. Further, the complex nature of these e-tools requires a robust technical infrastructure and a technically competent participant to operate them successfully.

Figure 13. Use of video/audio conferencing.



1.1.3 Many-to-Many Communication tools

e-Learning technology has the capacity to facilitate many participants to communicate simultaneously with many others through discussion groups and chat rooms.

Here again, as can be seen in Figures 14 and 15, it seems that, with the exception of Embracers, these approaches were little used. About two-thirds of the latter employed unmoderated discussion groups in their teaching, the majority of whom found them to be of value. By comparison, only one-quarter of Examiners, Doubters and Refusers used such an approach, most of whom rated it of little or no value. A similar pattern can be observed with respect to the use of chat rooms.

It seems that tutors are unaware of the benefits using these tools will bring to their courses, for example the benefits of peer collaboration on student achievement and satisfaction.

Figure 14. Use of un-moderated e-mail discussion groups.

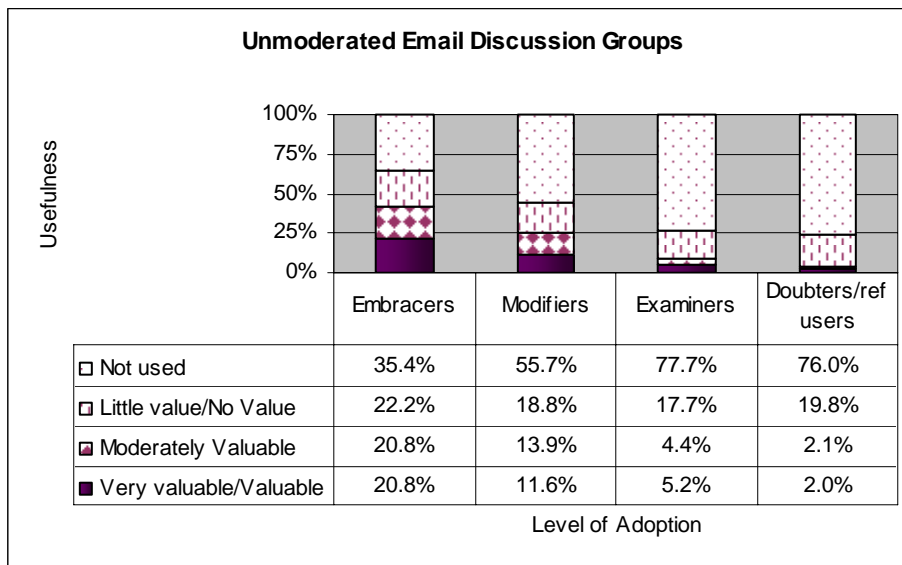
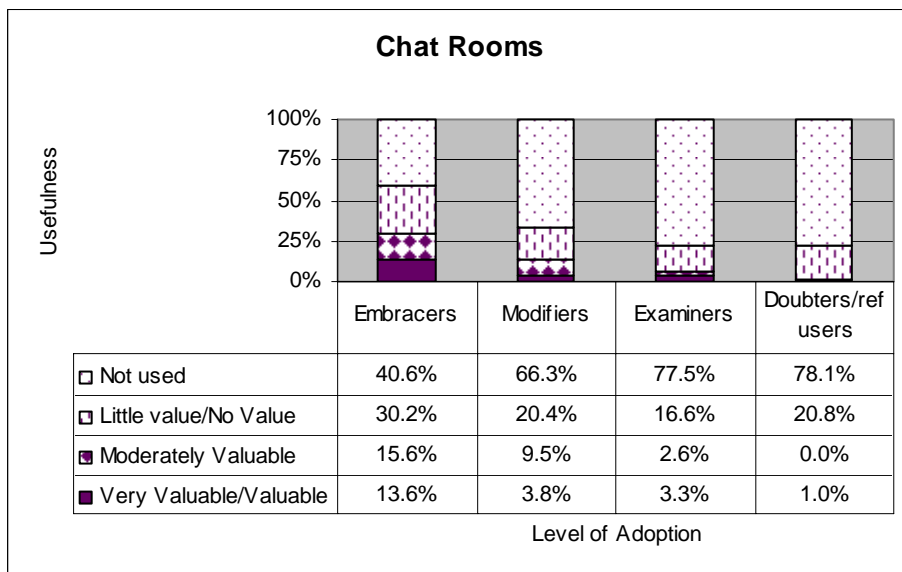


Figure 15. Use of chat rooms.



1.2 Presentation Tools

Computer technology enables the sophisticated enhancement of presentation of course-related content; this can be done through the utilisation of high, medium or low broadband.

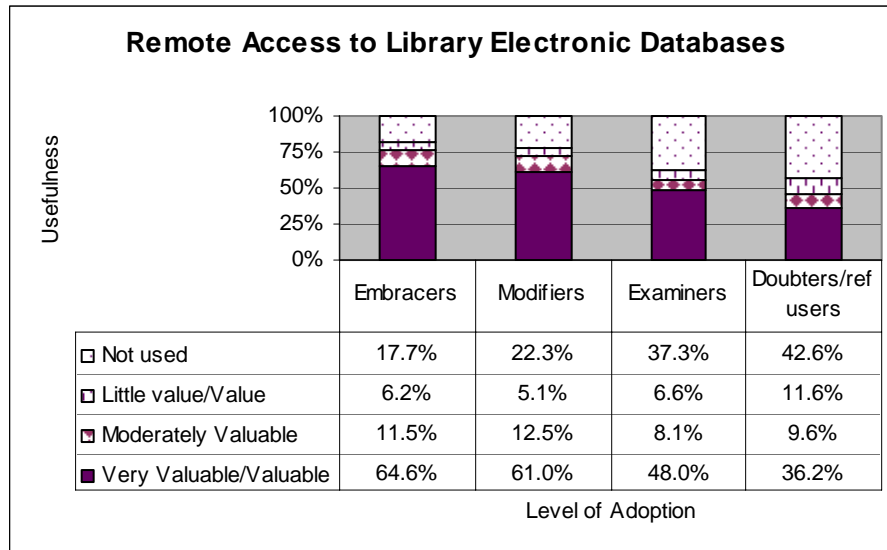
1.2.1 Low Broadband Requirements

In the following set of figures, data will be presented on tutors' use of six low broadband facilities.

Remote access to electronic databases. Figure 16 shows that tutors made wide use of remote access to library electronic databases in their teaching. As might be expected, Embracers and Modifiers were most inclined to use this approach (around 80%), most of them reporting that it was valuable or very valuable. Even over half of the Doubters and Refusers used it and mostly found it valuable/very valuable.

These findings point to the importance of ensuring that library staff are fully included in discussions of e-learning activities contemplated within an institution and are asked to provide advice and assistance on the services and e-resources libraries can provide.

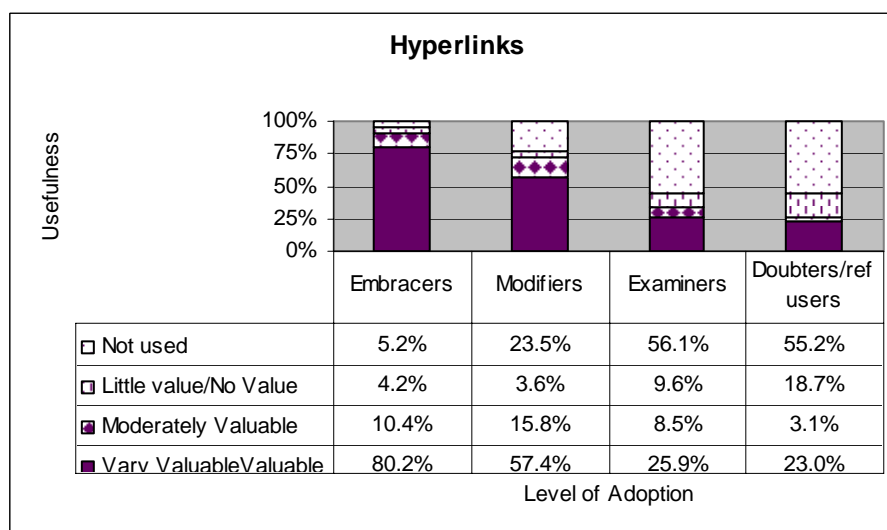
Figure 16. Use of remote access to a library's electronic databases.



Hyperlinks. Utilisation of hyperlinks showed a similar pattern, as can be seen in Figure 17, except that an even higher proportion (95%) of Embracers used this approach, with almost all of the users rating it valuable. In contrast, just under half of the Examiners, Doubters and Refusers used hyperlinks in their teaching, but of those who did, most found the approach moderately to very valuable.

These findings suggest that if professional development opportunities in information literacy skills, such as effective techniques in searching the web, are combined with the creation of collaborative discipline teams, where resources located are shared, this tool could be more valued and used.

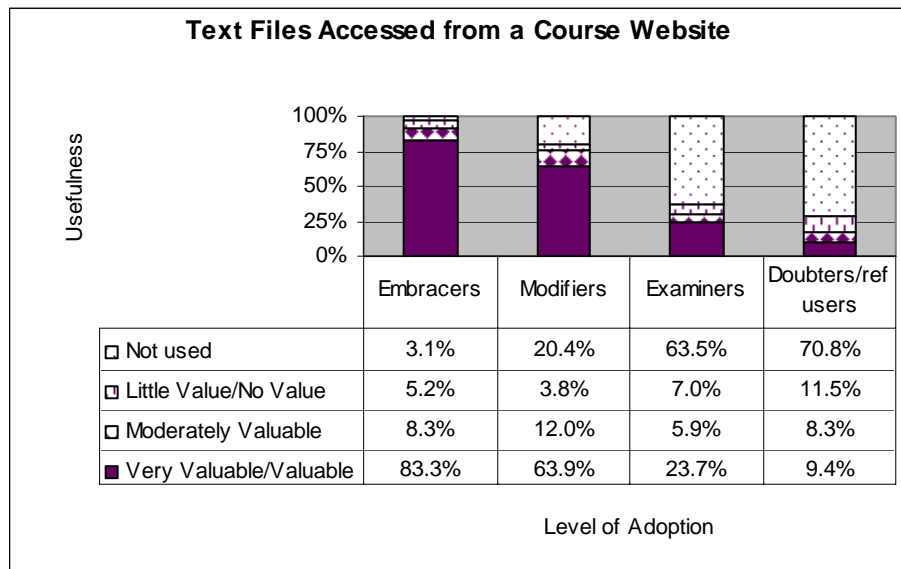
Figure 17. Use of hyperlinks.



Accessing text files. The above patterns continued for accessing text files from course websites (Figure 18), with over 95% of Embracers utilising this strategy and 85% of the users

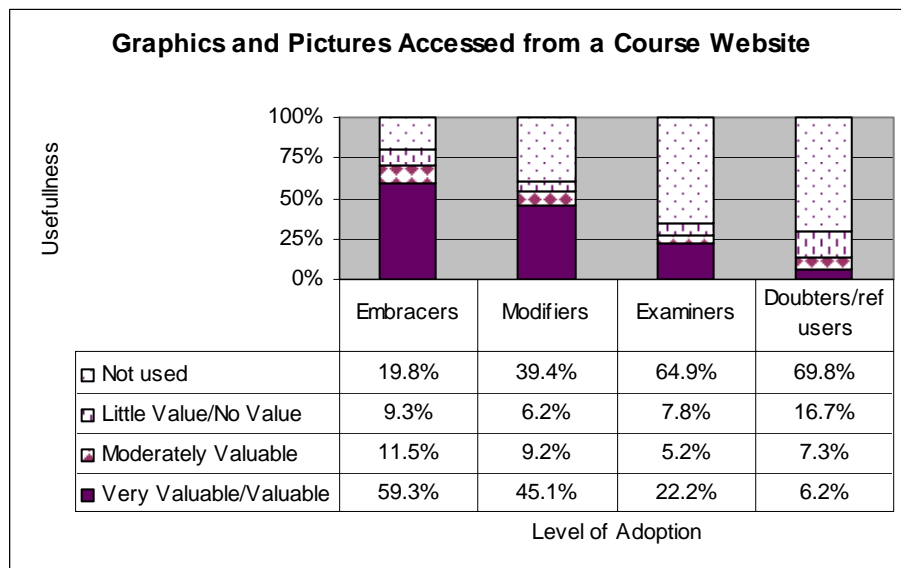
considering it to be valuable or very valuable. In contrast, only 30% of Doubtters and Refusers used this approach in their teaching and their opinions as to its usefulness was mixed.

Figure 18. Use of text files accessed from a course website.



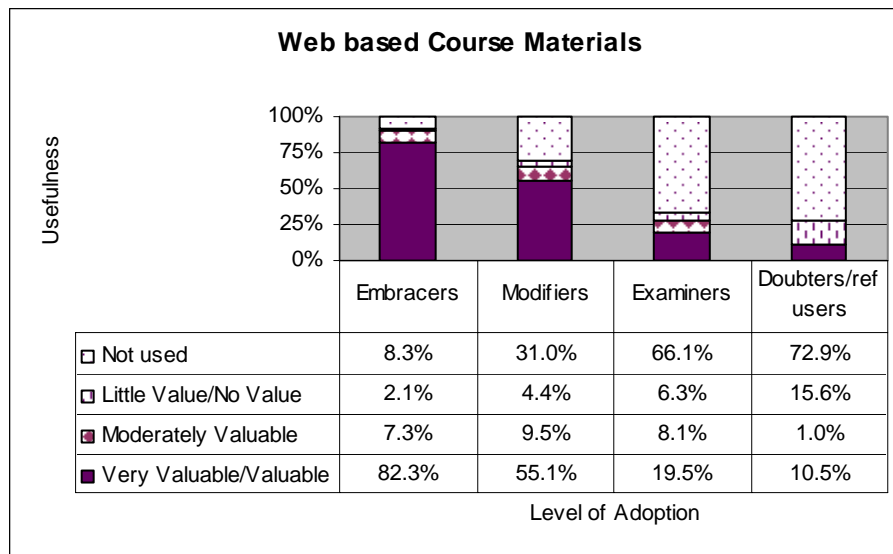
Accessing graphics. Use of graphics and pictures accessed from course websites presented a similar picture (Figure 19) to the previous variable, except that Embracers and Modifiers were less inclined to use this approach (80% and 60%, respectively) and their ratings of its usefulness were somewhat lower.

Figure 19. Use of graphics and pictures accessed from a course website.



Web-based course materials. Figure 20 shows that the use of web-based course materials was highly correlated with the tutors' degree of adoption of e-learning. Thus, while over 90% of Embracers utilised this approach, only a little over one-quarter of Doubtters/Refusers did so. Correspondingly, the vast majority of Embracers who used it rated it very highly, whereas the users in the other groups had a more mixed response.

Figure 20. Use of web-based course materials.

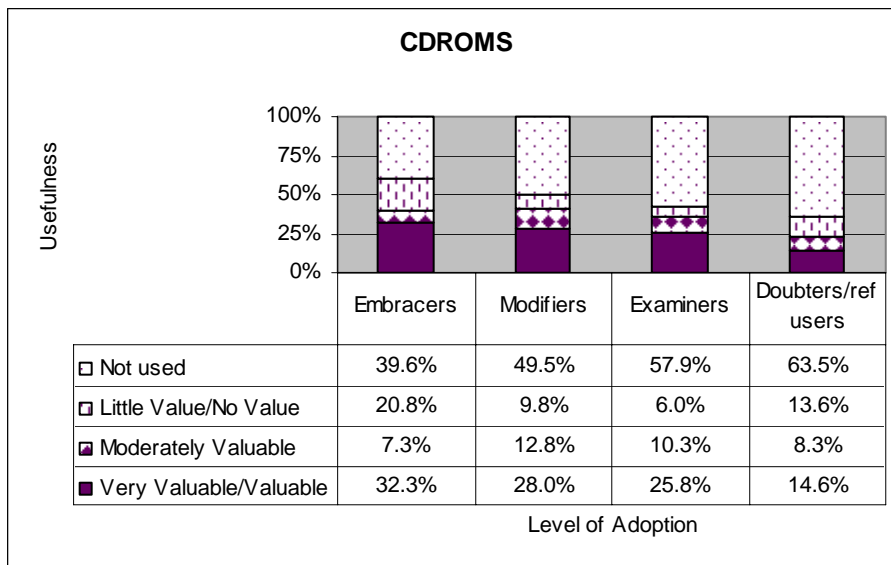


From the above, it seems that a majority of the tutors surveyed, particularly the Embracers, recognised the value of making course materials and resources readily available on a specific internet site. Since these e-tools are embedded in learning management systems, it could be argued that a significant majority of low adopters had not accessed or used the integrated e-environment learning management systems can provide. It would appear that there is a correlation between exposure to the tools of a learning management system and the use of new e-learning techniques and it is therefore suggested that tutors be exposed to these systems if e-learning activities are to increase.

CDROMs. Tutors' use of CDROMs in their teaching varied from 60% of Embracers to 36% for Doubters and Refusers, with the other two groups ranging between these two extremes (Figure 21). Of those who did use them, most found them at least moderately valuable.

Given (a) the publishing world's extensive production of supplementary CDs to accompany textbooks, (b) the increasing development of interactive CDs by educational providers and (c) the potential reduction in the required broadband capacity of student computers, it is surprising that this resource is not more widely used. Failure to utilise CDROMs more effectively might be due to the sheer volume of materials available and tutors' inability to adequately review this. It might also be due to tutors' limited information literacy skills. Professional development opportunities incorporating techniques to be followed when reviewing digital material and developing ways of sharing findings with other tutors within the same discipline could make this tool more valued and more widely used.

Figure 21. Use of CDROMS.



1.2.2 Medium and High Broadband Requirements

As can be seen in Figures 22 and 23, while two-thirds of the Embracers included downloadable audio or video files in their teaching, only half utilised streaming audio or video files. A similar shift occurred with Doubters and Refusers, the comparable proportions being half and one-quarter, respectively. The bulk of tutors who did use downloadable audio or video files considered this approach to be valuable, whereas those who used streaming audio or video files were more mixed in their judgments.

These findings could reflect three factors: the limited broadband capacity of tutors' computers, a lack of technical literacy required to operate such e-content, or the participants' computers lacking the necessary hardware, such as graphics card and processing speed, for the content to be speedily accessed.

Figure 22. Use of down-loadable audio or video files.

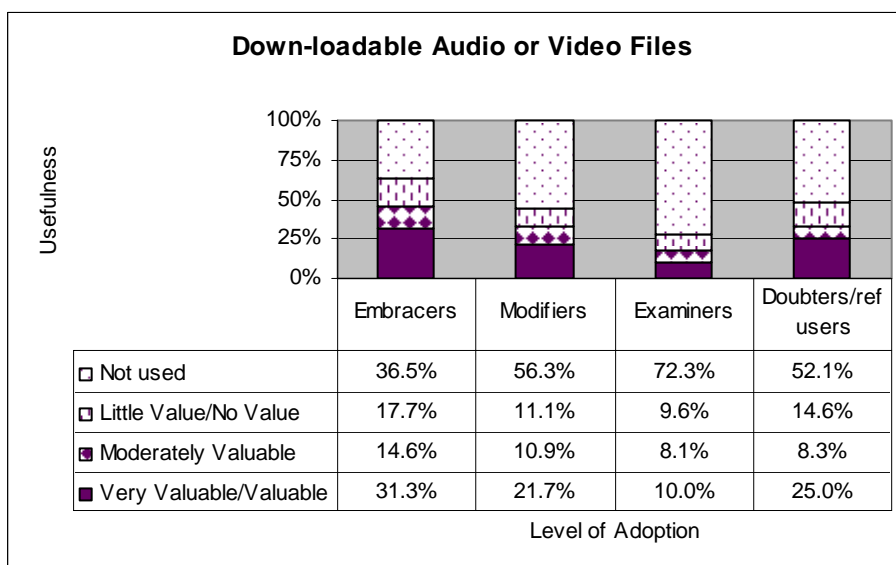
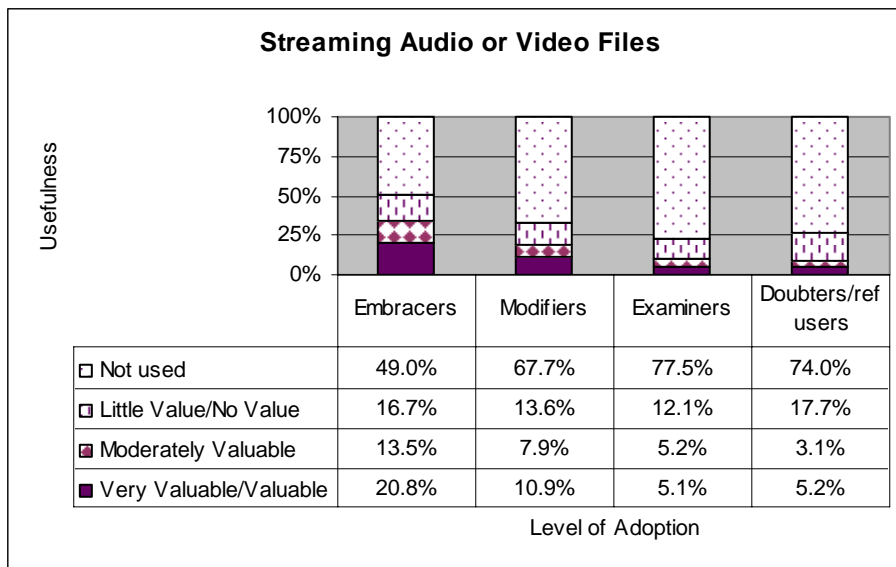


Figure 23. Use of streaming audio or video files.



1.3 Assessment and Administrative Tools

The web offers opportunities for tutors to manage the assessment of their students' work and other administrative aspects of their courses.

Web-based assessment. From Figures 24 and 25, it can be seen that web-based testing is not widely utilised, other than among the Embracers. Of the Embracers and the Modifiers who do employ this approach, it was generally found to be of some value, the opinions of the tutors in the other two groups being more mixed.

It is, perhaps, surprising that e-tools that are designed to reduce the tedious task of marking and recording simple assessments are not widely used by tutors. This may be because institutional academic policies and procedures do not adequately address the issue of delivering assessments via the web, preferring instead traditional face-to-face institution-based examinations.

Figure 24. Use of Web-based tests with grading and feedback.

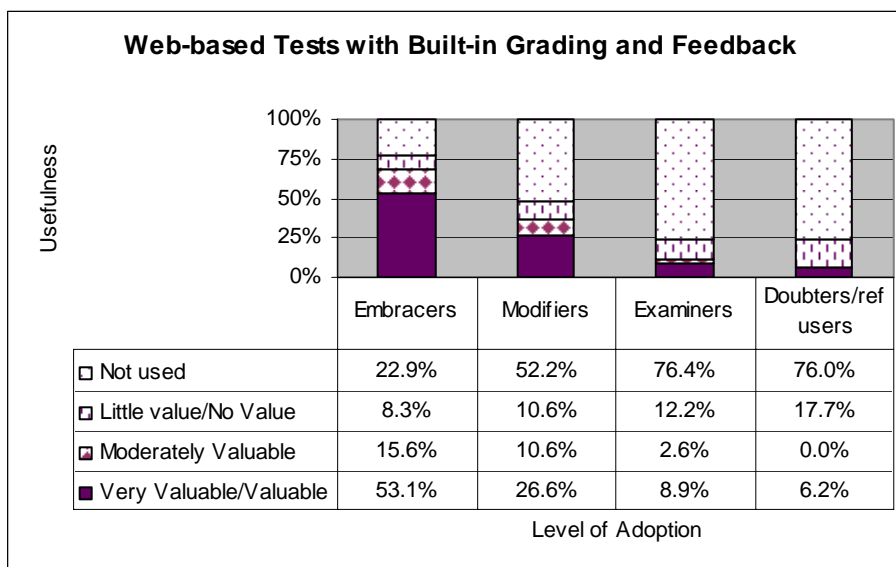
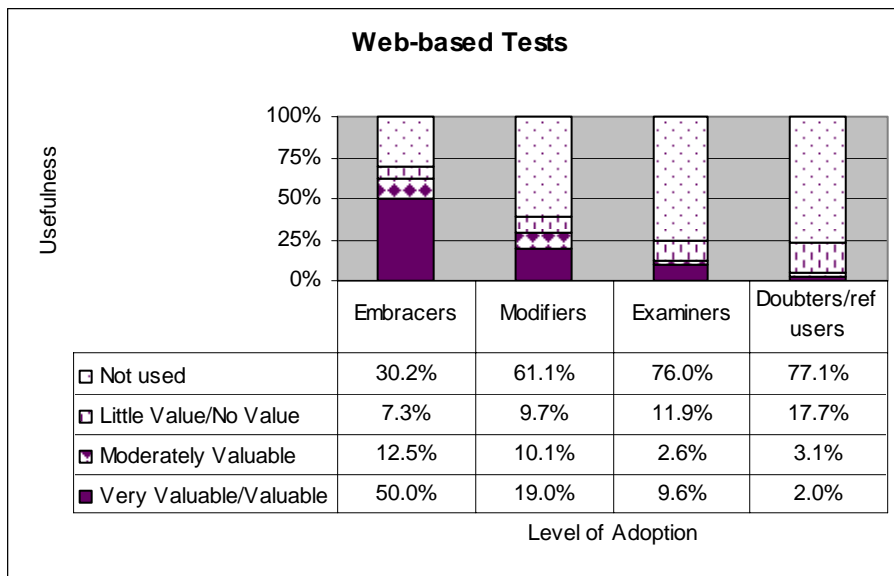


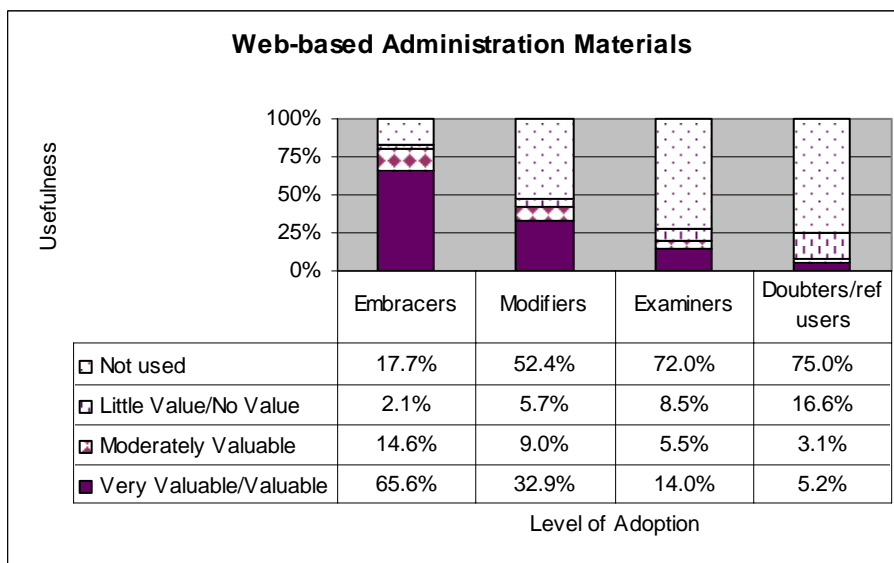
Figure 25. Use of Web-based tests.



Web-based administration. Figure 26 shows that while over 80% of Embracers used web-based administration materials, the remaining tutors’ usage ranged from just over half in the case of Modifiers down to around one-quarter for the Examiners and Doubters/Refusers. The Embracers who utilised this capacity were almost unanimous in the value they placed on it, the other users awarding it more mixed ratings.

Given the substantial institutional financial investment in the provision of web-based services and information it is significant that e-tools designed to reduce academic queries and provide student information services are not more widely used. Potentially, these e-tools could reduce tutors’ workloads and provide students with more immediate responses to queries.

Figure 26. Use of Web-based administration materials.

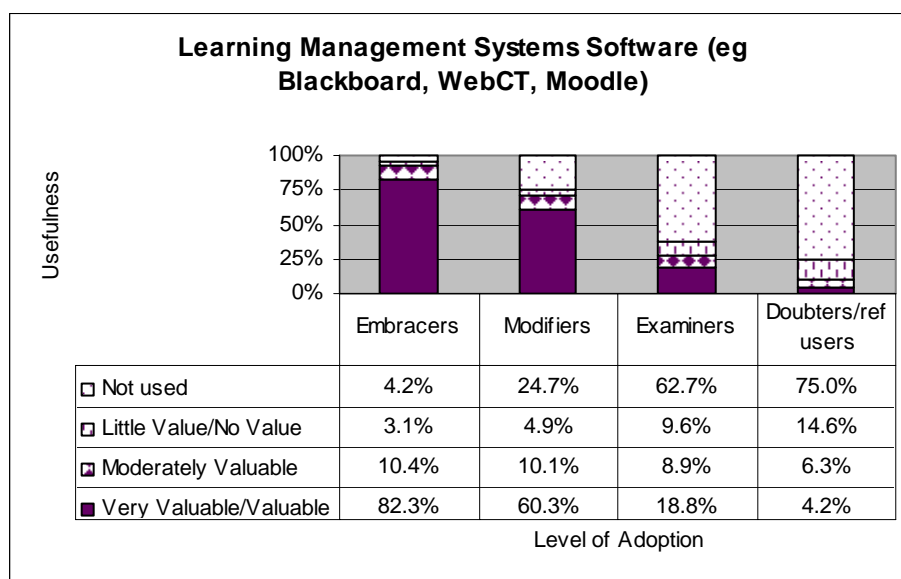


1.4 Integrated e-Learning Technologies

Tutors' utilisation of LMSs such as WebCT, Blackboard and Moodle was highly correlated with their levels of adoption of e-learning, as shown in Figure 27. Thus, nearly all Embracers used an LMS and the vast majority rated it as being valuable or very valuable. At the other extreme, only 25% of Doubtters/Refusers used an LMS, most of whom rated it of little or no value. The other two groups fell within this range, with Modifiers being more similar to Embracers and Examiners more similar to Doubtters/Refusers.

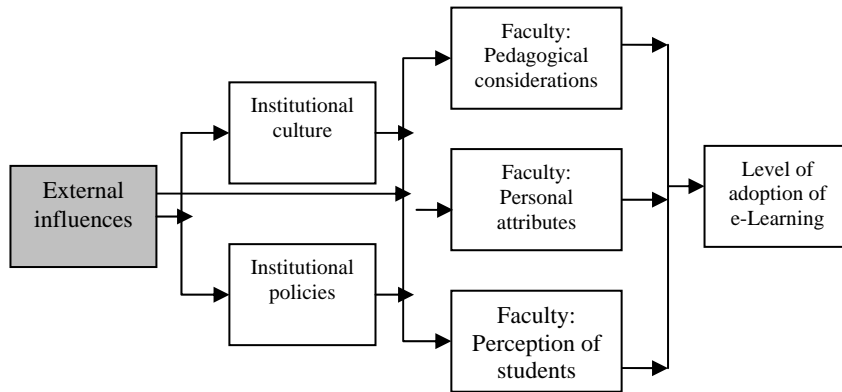
It would appear, then, that there is a strong correlation between exposure to the integrated e-environments potentially created by learning management systems and the use of new e-learning techniques.

Figure 27. Use of Learning Management Systems software (eg, Blackboard, WebCT, Moodle).



CHAPTER FOUR

MAJOR FINDINGS: EXTERNAL INFLUENCES



4.1 Introduction

In this chapter, we present the findings from all aspects of the project relating to the impact of external influences on faculty decisions to adopt e-learning into their teaching. As portrayed in our model in Figure 1 and Table 1, four such influences will be analysed: employers' expectations, students' expectations, competition from other institutions, and the reputation of the institution in the community. The literature bearing on each of these variables will be briefly reviewed and the relevant findings from the e-learning managers' survey, the case studies, the policy documents and the tutors' survey will be summarised. For more detailed information on all of these sources, the reader is referred to the separate reports produced by the project team.

4.2 Variable #1: Employers' expectations

Employers' expectations makes up one of the major external factors that influence the extent to which tertiary education institutions adopt e-learning. Such expectations may impact directly on faculty or indirectly through the mediation of the governing and management structures of their institutions.

Literature

The literature affords only indirectly relevant material bearing on employers' expectation. For example, in a text written primarily for company managers and CEOs, Simmons (2002) noted that the percentage of US companies providing access to e-learning for employees was expected to double between 2002 and 2004. However, while expectations for the adoption of e-learning grew significantly, the actual adoption rate has remained steady. Simmons cites a study of 144 US companies as evidence to indicate that, while an increasing number of companies are anxious to take advantage of e-learning's benefits and promises, most have found that there are significant barriers to adoption.

Managers' survey

The survey of the 18 e-learning managers showed considerable variation in the degree of importance they attached to tutors being influenced by employers' expectations that they should adopt e-learning. As can be seen in Table 12, just under half of them thought this factor was critically or very important, with just over half rating it as being of moderate or

little importance. The mean rating was 3.28 (based on a 5-point Likert scale, with critically important being assigned a score of 5 and negligible/no importance a score of 1)¹.

<i>Factor</i>	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' perceptions that employers expect them to adopt e-learning	2	6	5	5	0	3.28

Table 12. e-Learning managers' ratings of tutors' perceptions of employers' expectation as a driver of e-learning.

Case studies

In all three of the institutions studied, management were under pressure from employers of potential graduates to produce the kind of employees they need. In some cases, and particularly in the largest institution studied, this demand was for graduates with advanced skills and competence in computing and information technology. More often, these skills were less important in all three institutions. Nonetheless, employers are very aware of the expanding role of technology in industry and there is an increasing demand for a technologically literate workforce.

Managers saw the chief advantage of e-learning as the flexibility it provides. This flexibility will allow each of the institutions studied to more easily develop the variety of courses that employers demand, and the ability to provide these in times and places that suit employers and students. Investment in e-learning is therefore an investment in the institution because it allows the institution to increase enrolments, improve the quality of its courses and serve its regional community more effectively. Comments included the following:

[We need to ask] is your programme, 'Certificate in Welding,' meeting not only the ITO requirements for Welding, but the needs of 'Joe's Welding' down the road that is ringing us up to say, 'I need some graduates in welding. What the hell are you doing about it?' (Case Study 1, p.12)

We know that if employers like IBM come to us, that they've got high hopes and high expectations that our graduates will be competent or highly able in the digital arena. (Case Study 1, p.13)

Analysis of policy documents

ITPs' charters and profiles reflected two concerns in relation to e-learning meeting the training expectations of industry. Firstly, several noted that students will require technological knowledge and skills to meet the requirements of their workplace in the 21st century. Secondly, they noted that students will require training for their employees which is flexible so that they can study in their own time and at their own pace. Examples from the policies included;

Being flexible, creative and open to change, to better meet individual, industry and community needs.'

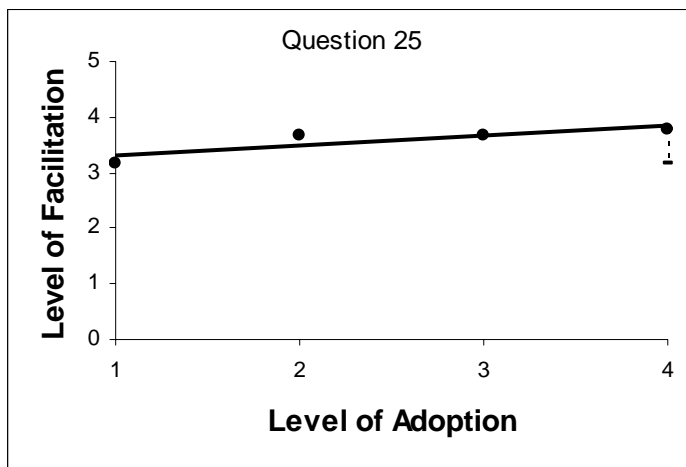
¹ Hereafter in this report, means derived from Likert scales will be calculated on a similar basis. In other words, the 'highest' or most 'positive' scores (e.g. 'critically important' and 'not a barrier') are assigned a 5 and the 'lowest' or most 'negative' scores (e.g. 'of negligible importance' and 'major barrier') are assigned a 1.

To provide innovative and quality education programmes which are relevant and accessible, and advance the economic, social and cultural development of the [named] community and the nation'

Tutors' survey

The tutors were asked to rate 30 factors in terms of the extent to which they facilitated or inhibited their use of e-learning in their teaching, one of these being their views on employers' expectations that their institutions should adopt e-learning. Figure 28 shows that, in general, tutors agreed that employers' expectations for e-learning were more facilitating than inhibiting (mean 3.66), a view that did not differ greatly from group to group (facilitation factor 0.58).

Figure 28. Effect of tutors' perception that their employers expect their institution to adopt e-learning on their adoption of e-learning.



Mean for total sample: 3.66

Facilitation factor: 0.58

Conclusions and implications

International literature indicates that employers' expectations for the adoption of e-learning are increasing. However there is little specific information on the degree of increase. Where information is available, it generally refers to commercial rather than educational institutions. Managers interviewed in the case studies pointed out that employers of their graduates increasingly expect graduates from their institutions to be competent in computing and information technology.

More than half the managers surveyed in this study agreed that employer expectations are an important factor in promoting tutor adoption of e-learning. While these skills are obviously more in demand in some occupations than in others, there is a general awareness of the expanding role of technology in industry. Consequently there are marked differences between courses within an institution and between institutions themselves. Managers and tutors see the chief advantage of e-learning as its flexibility. This flexibility might allow an institution to increase its student numbers by offering courses to students outside its normal catchment area, albeit that government policy is for ITPs to meet the needs of their own communities.

4.3 Variables #2: Students' expectations, #31: Recognition of students' motivations and interests and #32: Recognition of students' expectations of increased access to e-learning

Literature

Several studies have highlighted the important role that students' expectations play in influencing tertiary education faculty to adopt e-learning approaches in their teaching. For example, Bennett (2001) found that making learning experiences more interesting to students was one of the main triggers causing lecturers in a UK university to want to know more about new teaching methods, including information technology. Thus, the proposition, 'Nowadays students expect lecturers to employ new teaching technologies and methods as a matter of course', attracted a mean rating of 3.97 on a 5-point Likert scale. In a similar vein, Daugherty & Funke (1998) surveyed students and faculty in a US university. In exploring the advantages, disadvantages, and general effectiveness of using the Internet as a teaching and learning tool, they found that the perceived student benefits included:

- meaningful learning of technology through the integration of course content and computer applications,
- increased access to the most current and global content information available,
- increased motivation, and
- convenience.

Miller & Husmann (1999) examined US community college faculty incentives to participate in distance education, excluding correspondence programmes. Of 17 items, the incentive of responding to student needs scored very highly (mean 4.13 on a 5-point Likert scale). The perceived advantages of e-learning to students was also reported by Schifter (2000), who carried out a study of factors that motivate or inhibit faculty to participate in asynchronous learning networks. She found that one of the top five motivating factors for participants was a recognition of the greater flexibility it gave students. In a New Zealand study involving academic staff from the Department of Theology and Religious Studies at the University of Otago, Hyland (2003) found that participants for whom online technology held few or no fears were most influenced by factors external to themselves, such as benefits to students and the wider community.

Managers' survey

The e-learning managers rated students' expectations as the most important of seven listed factors in driving the development of e-learning in their institutions. Students' appreciation of the value of e-learning also received a moderately high rating. As can be seen in Table 13, the mean ratings for the two variables were 4.00 and 3.61, respectively.

<i>Factor</i>	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Meeting students' expectations	8	3	6	1	0	4.00
Students' appreciation of the value of e-learning	2	9	5	2	0	3.61

Table 13. e-Learning managers ratings of tutors' perceptions of students' expectation as a driver of e-learning.

Case studies

Managers, and to a lesser extent tutors, were aware of an increasing student demand for flexible and technology-rich learning environments in which the barriers created by time and space are reduced. e-Learning was seen as the most appropriate vehicle for creating these flexible learning environments. There was also an impression that students expect on-campus courses to be enhanced by e-learning, allowing them access to the web, the library, student facilities and tutors.

While e-learning might meet student demands for access and flexibility, there was evidence that some students were considered to prefer more traditional methods when it comes to teaching and learning. Tutors in all three case studies commented on the inadequacy of some students' computer skills. Perhaps more importantly, several tutors argued strongly that many students are reluctant to become involved in the critical thinking and inquiry learning that is a concomitant of e-learning:

It puts you off because you suddenly get all these stressed out students who are not particularly willing in the beginning to engage in on-line learning. (Case Study 1, p.25)

Students often don't like it. You say, "Go and find it on the net." They say, "No tell us where to find it, tell us how to do it." (Case Study 1, p.25)

They expect to come in and for you to give them everything. "Here I am. I've paid my money. Give it to me." (Case Study 1, p.25)

I think it's an inappropriate platform. They [students] are not self-motivated learners. (Case Study 1, p.25)

My students would find it very difficult to learn from a computer screen, to be quite honest. I find it quite difficult myself. (Case Study 3, p.52)

Tutors interviewed in Case Study One considered that many students were not skilled with computers. They resented having to teach computer skills instead of content. Many tutors also claimed that students don't like student-centred inquiry learning, preferring instead more traditional methods of teaching and learning. Tutors in Case Study Two claimed that students like e-learning and that it is an alternative mode of delivery which could suit their predominately Maori student population. Tutors in Case Study Three had a growing awareness of the need for information communication technology and rich-learning environments. They were aware, too, that current educational ICT practice in feeder schools could lead to an expectation that courses offered in their institution would include similar activities.

Tutors and management recognised that students in some fields expect e-learning and sophisticated technology as part of their courses. This was particularly true of international students. However, tutors, particularly those in Case Study One, pointed out that this expectation is not evident in all students as some expect and prefer more traditional teaching. All three institutions recognised an increasing student demand for flexibility in the delivery of courses.

Analysis of policy documents

A majority of the ITPs' policy documents reflected a perception of the importance of meeting students' requirements in relation to the provision of flexible delivery. This included providing access to learners from rural communities, learners with disabilities and those who wish to study in their own time and at their own pace. While some ITPs wished to attract students from a wider geographical region than their immediate community, others outlined the advantages of providing students within their community the opportunity to access course

materials via e-learning as an alternative to attending face-to-face classes. Examples from the policies included:

There will be continued growth in [named region] and [named region], but with increasing demand for alternative delivery options.

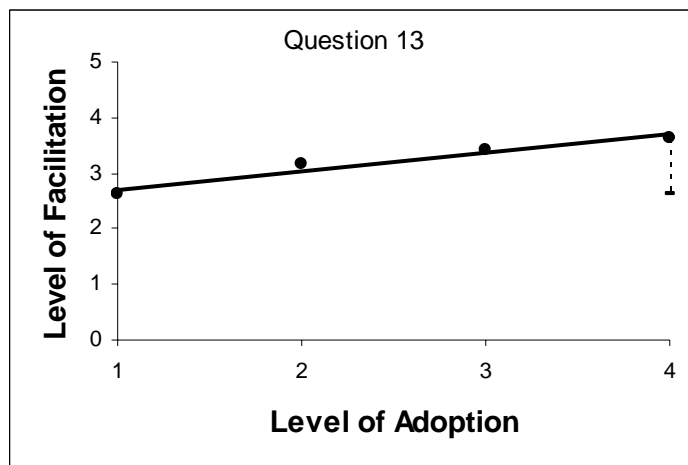
[Polytechnic X] gives particular attention to the needs of mid-career professionals who require flexible delivery options that will enable them to balance work and study.

The Institute already adopts a range of teaching styles and greater flexibility in the way teaching is undertaken and learning occurs is further being enhanced with the advent of e-learning.

Tutors' survey

The tutors were asked to rate 30 factors in terms of the extent to which they facilitated or inhibited their use of e-learning in their teaching. Of relevance are their ratings for the extent to which their students' appreciation of the value of e-learning facilitated or inhibited their use of e-learning in their teaching. With a mean of 3.28, it seems that this factor was neither facilitating nor inhibiting, but with a slight trend towards the latter (see Figure 29). The facilitation factor of 1.10 indicates that Embracers were somewhat more likely to see students' appreciation of e-learning's value as an influence than were Doubters/Refusers, with the other two groups somewhere in between.

Figure 29. Tutors' perceptions of the impact of students' appreciation of the value of e-learning on their adoption of e-learning.



Mean for total sample: 3.28

Facilitation factor: 1.10

Conclusions and implications

International literature suggests that student expectations are a major driver in encouraging faculty to adopt e-learning (Bennet, 2001; Daugherty & Funke, 1998; Miller & Husmann, 1999; Schifter, 2000). Research indicates that faculty in tertiary institutions in Britain, Europe, the United States and New Zealand are motivated to adopt e-learning because 'Nowadays students expect lecturers to employ new teaching technologies and methods as a matter of course' (Bennet, 2001). Meeting students' expectations was the key driver for the 18 respondents in the e-learning managers' survey that was part of this project. Managers who participated in the study argued that students expect courses to be enhanced by e-learning, allowing them access to the web, the library, student facilities and tutors. The surveys of

tutors indicated that they held similar views. Tutors who considered themselves low adopters are less inclined to accept that students have an interest in using e-learning tools, but generally tutors acknowledge that today's students expect to apply today's technology in their learning.

While it seems reasonable that faculty and management should make these assumptions, it is telling that no one appears to have asked the students. Assumptions about students' preferences, therefore, reflect only the views of faculty and management. Thus, while it is likely that students do expect a degree of e-learning in their courses, there is some limited evidence that students might not be as enthusiastic about e-learning as we imagine. For example, Zemsky & Massy (2004) suggest in their report to the Learning Alliance at the University of Pennsylvania

Students do want to be connected but principally to one another, they want to be entertained, principally by games, music, and movies and they want to present themselves and their work. e-Learning at its best is seen as a convenience and at its worst a distraction. (pp.iv)

In other words, students might not be attracted to e-learning *per se*; they may simply appreciate the entertainment and convenience that e-learning can provide. If this is the case, e-learning might not be their best, or their only, option.

Because ITPs teach such a wide variety of courses, it is inevitable that the needs and motivation of students will vary considerably. In some courses, students will necessarily demand sophisticated electronic equipment and teachers who are highly skilled in technology and electronic communication. Other students might require less sophistication and a more teacher-directed pedagogy. An interesting issue that arose in this study was one related to students' learning style. Many tutors suggested that a number of the students in their courses preferred traditional methods of teaching and learning because these did not demand the self discipline, self management, and critical thinking that is a concomitant of e-learning.

While it seems likely that students expect polytechnic courses to incorporate e-learning, there is no hard evidence to indicate that this is so or to suggest whether this assumption applies to all students. A survey of student attitudes and preferences might help to determine this and it could provide data that would help in the design and planning of future courses.

4.4 Variable #3: Competition from other providers (see also variable #33)

Literature

Dooley & Murphrey (2000) present the results of a study of how the perspectives of administrators, faculty, and support units in a US university impact on the use of distance education technologies. All three groups noted that competition from private and public institutions was perceived to be a threat. Administrators considered it to be the greatest threat, indicating concerns that the distance education market could encourage students to select courses and programmes globally, causing resident campuses to lose enrollments. In another US study, Park (2003) developed an evidence-based model that included faculty perceptions of the influence and support from the environment as a determining factor affecting the likelihood of their adopting instructional technology. In contrast, Hyland (2003), in a small-scale New Zealand study, found that since many participants decried the need for University policies promoting 'economically-driven education' in an internationally competitive environment and felt no commitment to a strategic direction into which they had had no input, these institutional issues were least influential in eliciting a positive responses.

Managers' survey

e-Learning managers had a range of views as to the importance accorded by tutors to their recognition that e-learning was necessary for their institution to gain a competitive advantage. Table 14 shows that opinions on this factor ranged right across the spectrum, with 2 rating it as being critically important and 2 as being of negligible or no importance and a mean of 3.33 on the 5-point Likert scale.

<i>Factor</i>	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' recognition that e-learning is necessary for ITP's competitive advantage	2	8	4	2	2	3.33

Table 14. e-Learning managers' ratings of tutors' perceptions of students' expectation as a driver of e-learning.

When asked about their views on management-level drivers of e-learning, the managers expressed a range of views on the relative importance of obtaining a competitive advantage for their institutions. As can be seen in Table 15, 7 of the 18 participants rated it as being critically or very important. On the other hand, improving access to learning for overseas students was rated very low as a driver of e-learning, with over half of the participants rating it as of little, negligible or no importance.

<i>Driver</i>	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Obtaining a competitive advantage for the institution	4	3	10	0	1	2.50
Improving access to learning for overseas students	0	2	6	7	3	3.61

Table 15. e-Learning managers' ratings of market factors as drivers of e-learning.

Case studies

Competition from other providers was a very important issue for management and tutors in Case Study One. They argued strongly that institutions have to develop a capacity for e-learning if they are to survive and compete in national and regional tertiary education. Competition was a less significant issue in the other two institutions, although tutors and management in each were aware that e-learning would provide them with the ability to offer courses nationally. Management in Case Study Three were aware that, as well as providing benefits, e-learning allowed other providers to enter an institution's traditional catchment and compete for students. This means that the institution must keep abreast of developments in e-learning if it is to ensure that students are not tempted to enrol in courses offered by other providers:

We've been told by secondary school careers advisers that we're at a serious disadvantage because we're not seen in this sector as being techno-savvy. We're not seen as having the kind of gear that they are seeing in other tertiary institutes and we're being bypassed because we don't have that kind of IT focus. (Case Study 3, p.52)

The technological developments are an important driver, the trend towards on-line and other forms of flexible delivery, will continue. [Polytechnic X] will play a strong part in this and we will lead in some of these areas. (Case Study 1, p.12)

There are no barriers to this kind of teaching and learning; our market is no longer our market in a lot of respects. (Case Study 3, p. 50)

Analysis of policy documents

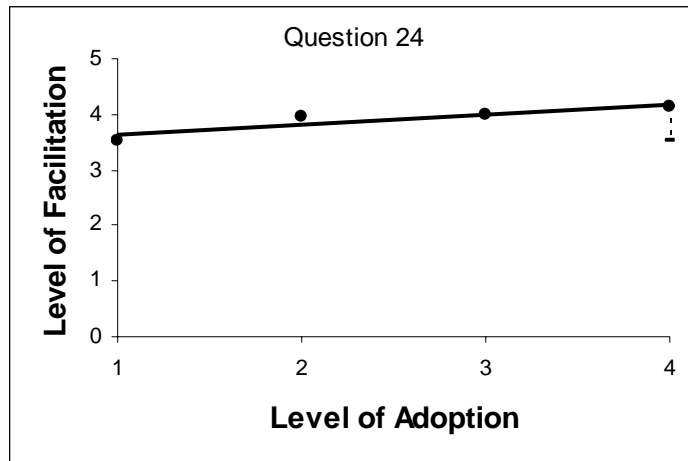
The need to develop e-learning in order to compete with other providers was not evident in the policies of the majority of the ITPs. Rather, the emphasis for all ITPs was on meeting the needs of their communities and developing areas of expertise in which they had an evident advantage due to the unique nature of their geographical area, or population base. Some of the larger ITPs included reference to the advantage of using e-learning to attract students and contribute to the tertiary education system as a whole. This is illustrated by an example from a policy document from one ITP, which stated:

We are committed to contributing to New Zealand's export education capability through developing learning design, e-learning and blended options for international delivery.

Tutors' Survey

The tutors' opinions of the extent to which their institutions need to obtain a competitive advantage through e-learning facilitated or inhibited their use of e-learning in their teaching indicated that this was a very influential factor (Figure 30). The data on this variable showed the fourth highest mean (3.95) of the 30 variables, coupled with a moderately low facilitation factors (0.60). In other words, irrespective of their category, the tutors' opinions that e-learning will be necessary for their institution to obtain a competitive advantage facilitated its adoption.

Figure 30. Effect of tutors' recognition that e-learning will be necessary for their institution to obtain a competitive advantage on their adoption of e-learning.



Mean for total sample: 3.95
Facilitation factor: 0.60

Conclusions and implications

The deployment of e-learning strategies in order to gain a competitive advantage emerges as a strong driver among tutors, although e-learning managers had a more mixed perception of this relationship. Variations in opinions might reflect the extent to which respondents felt that they could access 'captive markets' or the relative infancy of attempts by potentially competing

institutions to deliver comprehensive ranges of e-learning courses. The future reality, we believe, is that such competition will inevitably increase, possibly exponentially. ITPs that lag behind developments in e-learning could well find themselves with a diminishing pool of students.

4.5 Variable #4: Institutional reputation

Only one study addressed this issue, the participants in a small-scale US study conducted by Colaric, Taymans & Booz (2004) agreeing that online distance education does not decrease the reputation of the institution.

This issue was not directly addressed in the present study, but some participants in the three case studies made relevant points. All three institutions have a good reputation for providing a variety of courses over their whole region, often to students in remote areas. All three were anxious to preserve the reputation they enjoyed as a general vocational provider within their region and to a lesser extent, their reputation for providing specialised 'niche programmes' nationally. In the case of two institutions, real competition from other providers within their region was minimal. However, management and faculty were aware that e-learning could prove to be a 'double edged sword' by furnishing other providers with access to their students. Tutors in both these institutions regarded the introduction of e-learning as a vital element in maintaining their regional reputation and tutors were conscious of the need to ensure that e-learning offerings matched the quality of current face-to face teaching. The third institution studied has an established reputation for leadership and innovation in education in general and in e-learning in particular. Management and faculty at this institution were proud of this reputation and considered it very important that the institution maintains it by staying at the forefront of technological development and e-learning.

The main thing is to be able to move with the times and to provide flexible access to people within our region. (Case Study 3, p. 48)

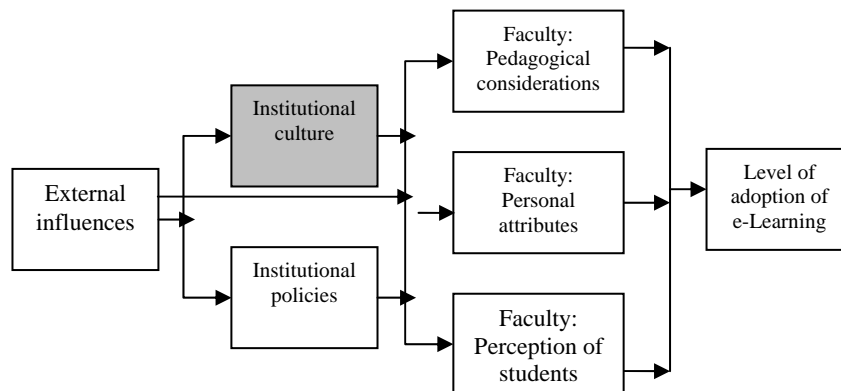
If we are to continue as one of the uppermost leaders in the polytechnic system we need to think about the consequence of [not adopting] e-learning and what that means for us in terms of what we do. (Case Study 1, p.12)

Also, although institutional reputation was not an explicit concern in ITPs' policy documents, it was implicit in the majority of them. This supports the reports contained in the case studies where many tutors and managers said that students in some fields expect e-learning, and sophisticated technology to be part of their course. Several ITPs' policy documents stressed the need for e-learning if they were to meet the expectations of the students and the social and economic needs of their communities. They included reference to flexible delivery enabling greater diversity of access and to the need to strive for excellence by being innovative and responsive to the needs of the stakeholders within their community. The larger ITPs in particular highlighted the advantages that e-learning can provide.

To conclude, this issue was not directly addressed in this project and it is not widely discussed in international literature. All of the institutions studied in this project were jealous of the good reputation they enjoyed within their regions. All saw it as important to maintain the reputation they have with potential students and with potential employers of their graduates.

CHAPTER FIVE

MAJOR FINDINGS: INSTITUTIONAL CULTURE



5.1 Introduction

In this chapter, we present the findings from all aspects of the project relating to the impact of aspects of institutional cultures on faculty decisions to incorporate e-learning into their teaching. As portrayed in our model in Figure 1 and Table 1, two such influences will be analysed: (a) institutions' supportive culture, values, atmosphere and change orientation, and (b) institutions' acceptance of the value and legitimacy of e-learning. The literature bearing on each of these variables will be briefly reviewed and the relevant findings from the e-learning managers' survey, the case studies, the policy documents and the tutors' survey will be summarised. For more detailed information on all of these sources, the reader is referred to the separate reports produced by the project team.

5.2 Variables #5: Supportive culture, values, atmosphere, change orientation, and Variable #6: Acceptance of value, legitimacy of e-learning

Literature

For e-learning to be accepted and embraced by faculty, it is necessary that their institution's culture is supportive of its value and legitimacy – a point that is emphasised explicitly or implicitly by many writers. Thus, in their analysis of 32 studies of organisations aimed at identifying the barriers to using distance education Cho & Berge found that nearly half (15) focused on organisational change as the major variable. They noted that most organisations are resistant to change and that without a shared vision for distance learning, a strategic plan, and key players within the organisation who are knowledgeable and supportive of distance learning, implementing such a programme is a slow and difficult process.

In a large scale study, under the auspices of the Sloan Corporation Allen & Seaman (2003) surveyed all 3,033 degree-granting institutions of higher learning in the USA. Responses were received from 944 (32.8%). Their main findings included the following results from public institutions:

- A total of 80.2% offered both online and blended courses, 12.5% online courses only, 3.8% blended only and 3.4% neither blended or online only.

- Online education was seen to be critical to the development of long-term strategies: agree: 85.7%, neutral: 6.6%, disagree: 7.7%
- Compared to face-to-face, learning outcomes in online education were considered to be superior (17.4%), same (57.6%), inferior (24.9%)
- Nearly one-fifth thought that in three years' time the quality of online learning would improve from inferior to superior to face-to-face learning.
- Faculty acceptance of the value and legitimacy of online education: strongly agree/agree: 70.5%: neutral: 18.3%, strongly disagree/disagree: 11.3%

In a study of 64 potential barriers to distance education, as perceived by faculty, support staff and managers/administrators, Berge & Muilenburg (2000) found that organisational resistance to change and a lack of shared vision for distance education in the organisation, were rated third and fourth, respectively. The authors argued that it seemed that all survey respondents clearly recognised the need for cultural change throughout their organisations.

In an opinion piece, Errington (2001) noted that management needs to send clear messages via appropriate policies and strategies. The worst approaches to institutional innovation can occur when the institution is “foggy” about its mission. Errington argued that this message of intent needs to have clear rationale, with faculty needing to know that there is a collective institutional vision with clear leadership and that they are supported from the top. He goes on to emphasise that the quality of support for new initiatives is embedded in the institution’s own culture and the quality of institutional infrastructure. The degree of perceived institutional support for teachers is an important factor in innovation because change involves more than technical considerations, it also requires a change of culture.

In a similar vein, Hodas (1993) proposes that technology is never neutral; its values and practices must always either support or subvert those of the organisation into which it is placed. He argues that the failures of technology to alter the look-and-feel of institutions results from a mismatch between the values of the institution’s organisation and those embedded within the contested technology. What appears to outsiders as a straightforward improvement can, to an organisation, be felt as undesirably disruptive if it means that the culture must change its values and habits in order to implement it.

According to Jaffee (1998), obstacles preventing the widespread implementation of e-learning, and the associated forms of opposition and resistance, must be analysed in an organisational context that examines the prevailing academic culture and the widely institutionalised value placed on classroom-based teaching and learning. In academia, he argues, obstacles to change are closely associated with the established practices and the cultural traditions of the teaching faculty. Further, in order for institutions of higher education to undergo significant transformation, changes must be approved, accepted, and ultimately put into practice by the teaching faculty. Top-down initiatives and administrative directives have little chance of being translated into action without faculty compliance. While the administration is formally in a supervisory and authoritative role, in actual practice the system of faculty governance, alongside a weak enforcement and discipline structure, render many administrative directives impotent. Jaffee concludes by stating that institutions of higher education are constrained by habit, tradition, and culture, and that these represent the most significant obstacles to organisational change.

Managers' survey

From Table 16 it can be seen that of the 18 e-learning managers, 11 considered that the notion of e-learning enhancing the quality of learning and teaching across the institution was a critically important or very important driver.

Driver	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Enhancing the quality of learning and teaching across the institution	4	7	5	2	0	3.72

Table 16. e-Learning managers' ratings of the extent to which enhancement of learning and teaching was a driver of e-learning.

When asked to give their views on the extent to which organisational structures in their institutions constituted barriers, the managers were spread across the spectrum, with a mean rating of 2.89 signifying that these structures were considered to be of moderate significance (see Table 17).

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Current organisational structures	2	3	6	5	2	2.89

Table 17. e-Learning managers' perceptions of current organisational structures as a barrier to the further development of e-learning in their institutions.

Case studies

Policy documents in the three institutions studied stressed the importance of a healthy and dynamic workplace that, 'nurtures contribution and innovation and provides a supportive accountable environment' (Case Study 1, p.11). Management pointed out that faculty and staff needed to understand both the need for change and the process of change before any real change could take place. They were aware of the need to provide a working environment conducive to change and to e-learning. This involves providing a reliable technical and professional development infrastructure and supporting this with effective strategic, financial, human resource policies. Over 70 percent of one institution's students are Maori. The e-manager claims that the introduction of e-learning is an opportunity to provide alternative ways of learning and teaching which may appeal more to Maori learners.

Only one institution had so far taken concrete steps to initiate policies. The manager in this institution spoke of the need for both technological and pedagogical support. He emphasised that this support should be available to students as well as faculty.

All three managers spoke of the need for consultation with faculty, but tutors were not always confident that this would take place. There was some suspicion that changes to e-learning were essentially management-driven and concern that faculty might not be consulted about its introduction. Interviewees agreed that 'stakeholder buy in' is important if faculty are to be convinced of the benefits of e-learning.

I think it's better if you can show [tutors] the benefits. Even if you do make it an instruction, you must provide the support that will allow people to achieve it, and some will need more help than others. (Case Study 1. p.14)

Often the executive or management get the wrong idea. They see e-learning not as something that can improve the experience for students and trying to keep up with the 21st Century, it's seen as a way of increasing revenue. (Case Study 1, p.20)

The issue is, they're keen to have us do e-learning but I don't see support for this. (Case Study 1, p.21)

If the institute is serious, they have to give us support. ... What I'm saying is, if they want us to come to the party, they've got to support it. (Case Study 1, p.21)

Attitudes towards e-learning varied in each of the three institutions studied. In the first, management were enthusiastic, regarding e-learning as a valuable necessity. While tutors in this institution generally agreed that e-learning made teaching more efficient and effective for students and for faculty, most preferred to incorporate e-learning into multi-faceted courses that integrate aspects of e-learning with face-to-face-teaching, demonstration and other elements of more traditional teaching. Faculty who were more experienced with e-learning tended to be more enthusiastic about its benefits. Tutors and management in the second institution were united in their enthusiasm for the potential of e-learning. The tutors interviewed agreed that e-learning can and will enhance teaching and learning and encourage innovation. While management in the third institution saw real benefits in adopting e-learning, tutors were more cautious and were likely to remain so until it could be demonstrated to them that e-learning will improve the quality of their courses.

I think there's potential to use it in a range of ways (Case Study 1. p.18).

[With e-learning] a larger amount of the course is more on high level thinking skills and actually applying knowledge to a particular situation. (Case Study 1. p.18)

Student access is its big advantage. We run programmes for the whole country. (Case Study 1. p18)

Students are not necessarily here all of the time, particularly in the area in which I teach. Now they can access their material if they happen to be at the hospital, on one of those computers, or the library here or at home. (Case Study 1, p.18)

Analysis of policy documents

The policy documents of the larger and several smaller ITPs contained explicit support for the introduction of e-learning and the development of a culture which supported equity of access, flexibility and innovation. Several recognised the advantages that e-learning would provide in meeting the needs of their regional communities. A minority of ITPs acknowledged the use of e-learning, without explicitly including policies that addressed the issues involved in the change process. Examples of references to a culture and acceptance of e-learning in the policy documents include:

[Polytechnic X] fosters an institutional culture in which innovation and enterprise are expected and rewarded, and is committed to providing graduates with the knowledge and skills to face the challenges of the future and to live in a multi-cultural world.

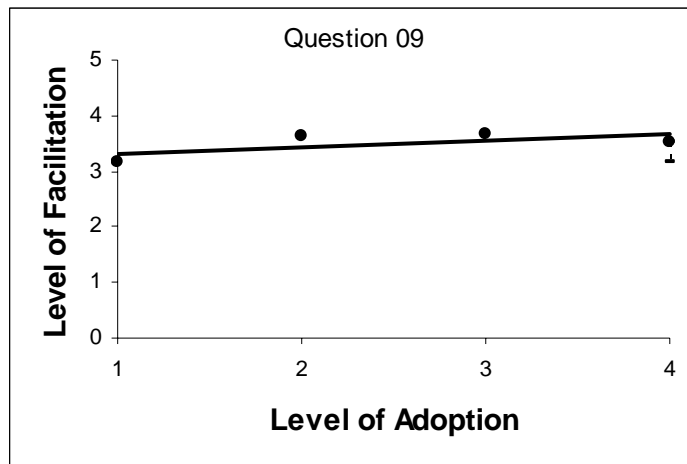
The Institute already adopts a range of teaching styles and greater flexibility in the way teaching is undertaken and learning occurs is being further enhanced with the advent of e-learning. [Polytechnic X] has a commitment to deliver education and training, where feasible, in a way that facilitates access, recognises difference, and produces quality outcomes.

It is the aspiration of the polytechnic to ensure that staff are appropriately qualified, with skills that are transferable and flexible, within a culture where diversity and change are accepted, and innovation is valued.

Tutors' survey

As shown in Figure 31, the effect of management support for e-learning was rated by tutors as having neither a facilitating nor an inhibiting effect on their uptake of e-learning, but with a trend towards the former effect (mean of 3.60) The facilitation factor of 0.46 suggests that there is only a low positive relationship between tutors' levels of e-learning adoption and their ratings of management support.

Figure 31. Effect of senior managements' support for e-learning on tutors' adoption of e-learning.



Mean for total sample: 3.60

Facilitation factor: 0.42

Conclusions and implications

Technology is never neutral; an institution's values and practices must either support or subvert technology in those institutions in which it is placed. For this reason, as Errington (2001) & Hodas (1993) point out, teacher beliefs have a significant impact on the relative success of innovation. Teacher beliefs influence what is possible and appropriate. Administrators are generally anxious to promote change because of the perceived benefits this change can bring to their institutions. Policy documents and the e-learning managers' survey examined as part of this study emphasised the need to promote change and conditions in which e-learning will flourish. This promotion is regarded as essential if institutions are to maintain leadership in a competitive market and meet the changing needs of diverse stakeholders. However, if e-learning is to be adopted successfully, faculty need to be convinced of its value.

While some commentators argue that institutions are generally resistant to change, researchers like Miller & Husman (1999) claim that faculty have an inherent interest in teaching with technology and see internal rewards as the dominant motivation for involvement. Evidence from the tutors' survey and from the tutor interviews conducted in this study seems to support this view. While some tutors were reluctant to abandon proven methods, most expressed a willingness to adopt e-learning provided its effectiveness in their courses could be demonstrated. While sometimes reluctant to teach a course using e-learning alone, tutors were almost always willing to utilise e-learning provided it could be used in combination with other teaching methods.

Tutors pointed out that almost all faculty in tertiary institutions are already using e-learning to a greater or lesser degree. Interviewees, especially in institutions where e-learning is

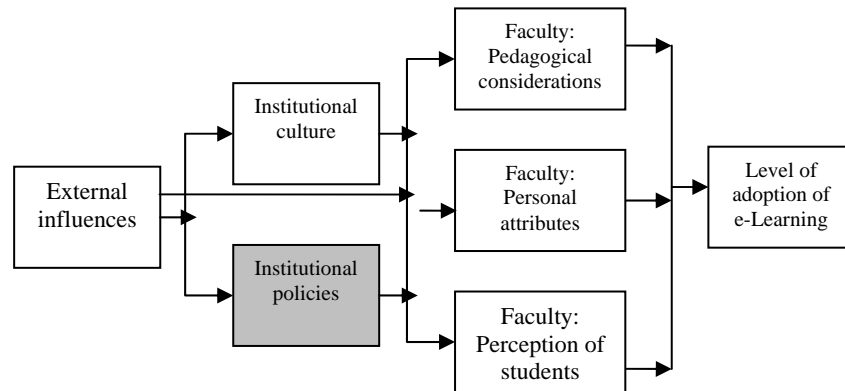
already well established, were generally enthusiastic about adoption, claiming that e-learning is easy to use once courses have been developed. While some tutors argued the functional nature of their courses and the need for students to demonstrate practical proficiency, they also pointed out that e-learning provided better access to data, improved contact with students, immediacy, and an opportunity to discuss and debate issues.

Faculty will more readily adopt e-learning when it can be proven that this method of teaching and learning is more effective than those they currently use. As Berge & Muilenberg (2000) point out, there is currently a dearth of research on the effectiveness of e-learning. Some real evidence in this field would be extremely useful. In other respects, most faculty were already well aware of the benefits e-learning can provide. Administrators in this study emphasised their readiness to prove the value of e-learning by 'demonstrating to faculty that e-learning can enhance their courses' (see Case Studies report, p 15).

International literature and the findings of this project suggest that where an institution's vision for e-learning is unclear, the institutional culture is conservative rather than innovative. Where this is the case, e-learning has no legitimacy and faculty are unsupported in new teaching and learning initiatives. It becomes difficult for e-learning to flourish and adoption is slow. Conversely, where the institutional vision for e-learning is clear and the institutional culture is innovative, faculty are supported in new teaching and learning initiatives and e-learning will have a much greater impact throughout the organisation.

CHAPTER SIX

MAJOR FINDINGS: INSTITUTIONAL POLICIES



6.1 Introduction

This chapter outlines findings on the impact of institutional policies on faculty decisions to incorporate e-learning into their teaching. As portrayed in our model in Figure 1 and Table 1, ten such influences will be analysed. These include such variables as the development of long-term strategies, the provision of professional development, time to develop and deliver courses, and the resolution of contractual matters. As in the previous chapters, the literature bearing on each these variables will be briefly reviewed and the relevant findings from the various aspects of the study will be summarised.

6.2 Variable #7: Development of long –term strategy

Literature

Following on from the previous section concerned with institutional culture, several writers argue that for a new culture incorporating e-learning to be adopted, it is necessary for institutions to formulate and implement a long-term strategy. The importance of this was reflected in a study of 64 potential barriers to distance education, as perceived by faculty, support staff and managers/administrators in a range of US higher education institutions, Berge & Muilenburg (2000) found that a lack of strategic planning rated 7th out of 64 potential barriers. Similarly, Rockwell et al. (1999) examined incentives that encourage faculty to develop educational opportunities via distance and obstacles that discourage them from doing so in two colleges in a US university. They reported that administrators felt faculty concerns about teaching via distance related to, among other factors, a lack of an overall plan for distance education programmes where such courses were being offered sporadically rather than as part of a specific curriculum. More specifically, according to Microsoft Scholars (1997), a leading group of US academics and instructional technologists, one of the major factors that inhibit the accelerated adoption of technology in higher education include a lack of coordinated planning for technology at departmental, institutional and system levels. Finally, in their study of academic staff from the Department of Theology and Religious Studies at the University of Otago, Hyland (2003) reported that many decried the need for University policies promoting ‘economically-driven education’ and felt no

commitment to a strategic direction into which they had had no input. These institutional issues were therefore least influential in eliciting a positive response from participants.

Managers' survey

e-Learning managers views on the degree to which a lack of an institutional policy constituted a barrier in their institution ranged across the spectrum, with approximately one-third rating it as a major or significant barrier, another third as a moderate barrier and the final third as only a minor barrier or no barrier at all. As indicated in Table 18, the mean rating was 2.94.

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Lack of institutional policy on e-learning	2	4	5	5	2	2.94

Table 18. e-Learning managers' perceptions of lack of institutional policy as a barrier to the further development of e-learning in their institutions.

Case studies

All three institutions have long-term policies in place, although some of these are considerably more advanced than others. All three institutions were committed to e-learning, and establishing comprehensive and specific policies was an important goal in each of them.

We have to have answers to these questions very soon, because we've got to plan a building programme around it. By the end of this year there are likely to be some more answers to those things than there are just at the moment. (Case Study 1. p.15)

The danger comes when the institution says, 'We will have on-line learning in this area, and it will happen,' then it doesn't come organically from the needs of the tutors or the content of the course, it comes from on high because it's the corporate vision or whatever. Then you can end up with it working inappropriately and spending a lot of time, money and resources to develop something which isn't very appropriate. (Case Study 1, p.20)

For example, at the moment we do the first year of Bachelor of Commerce in - -, and we do it here as well. We drive tutors across to - -, but e-learning could have a hugely useful part to play [in reducing costs].

We need positive action in developing a way that the sector can develop, implement, upgrade and keep e-learning materials current. This saves every institute having to do the same thing. (Case Study 3. p.49)

A lot of people were really getting interested and starting to do things and getting excited but we have not provided the infrastructure to support that and so they've either gone off and done their own thing completely independently or they've done something internally, and minimally with a local internet server, or they've completely disengaged. (Case Study 3. p.48)

Analysis of policy documents

The majority of the ITPs' policy documents indicated their intent to develop strategies for the inclusion of e-learning in their policies; however, as the case studies indicated, some were considerably more advanced than others. A small minority of ITPs had specific strategies for the implementation of e-learning some in considerable detail. Two of these were developing e-learning to specifically support and enhance an identified niche in distance learning.

There was clear evidence of collaboration in the development of e-learning projects among the ITPs. For example five were members of the Tertiary Accord of New Zealand (TANZ), whose members 'work together to share resources and best practice in developing new ventures and programmes'. Each of the five included reference to the development and use of e-learning courses by TANZ in their policy documents. Seven ITPs were members of E-Learnz, which was established in July 2003 'in response to the Government's direction for tertiary education organisations to collaborate with each other in developing their e-Learning capabilities'. Five ITPs were members of the Tertiary Education Alliance (TEA), which supports cooperation in the development of e-learning in each of its member institutions.

Those with a long-term strategy had policies covering the years up to 2007 or beyond, while the policy documents of other ITPs outlined their intention to develop a policy. Examples from the policy documents include:

- Establish [Polytechnic X] as a centre of excellence for e-learning – specialising in provision for Maori learners. (A detailed plan for the implementation of this objective through to 2007 is included in the profile.)
- Our objectives are (a) to increase uptake so that we can develop our e-learning capacity in order to (b) decrease the barriers to access that distance and/or disability may provide. No specific targets are associated with this objective, but we expect that these will be developed for 2006.

Tutors' survey

Not surveyed.

Conclusions and implications

International literature indicates that a lack of a long-term strategy is a major barrier to innovation. This is particularly true when the innovation involves new technology. Considering that all of the institutions surveyed expressed a commitment to e-learning, it is significant that only one third of e-learning managers considered long term planning to be a major or significant barrier. Only one of the three institutions participating in the case studies had begun a comprehensive long-term e-learning plan.

6.3 Variable #8: Provision of professional development for faculty

Given that e-learning requires the acquisition of both technological skills and an appreciation of the pedagogical possibilities of the approach, it is not surprising that professional development is required for the majority of faculty who plan to work in this area.

Literature

There is ample evidence that professional development plays an important role in influencing faculty adoption of e-learning. For example, in their analysis of 32 published in-depth case studies, Cho & Berge (2002) found that 11 identified the lack of technical expertise, support and infrastructure as constituting barriers to using distance education. Thus, in a study in a UK university, Bennett (2001) found that lecturers considered a lack of training to be major barrier to their adoption of new teaching methods. (However, in a finding with significance for determining the nature of professional development, he noted that many lecturers claimed that they were largely self-taught, reporting that, in the main, they obtained their information informally. The information so gathered was regarded as more credible and trustworthy than

that available from “official” sources.) Bennett also found that the possession of a formal teaching qualification was a major determinant of whether an individual implemented new teaching methods. In another UK study, a consortium of research organisations led by the Social Informatics Research Unit at the University of Brighton (2003) found that a lack of academic staff knowledge and a lack of academic staff development were among the top five constraints on, and barriers to, the further development of managed learning environments (MLEs). Conversely, the requirement for large scale and continuous staff training/staff development constituted a major requirement for developing MLEs.

Three US studies are also of relevance. Firstly, Betts (1998) found that faculty in a university gave high priority to the opportunity to attend workshops and seminars (e.g., demonstrations, hands-on learning, tutorials, and collaboration between experienced and non-experienced faculty). They were interested in seminars and workshops that focused on skill development, the use of new technologies, designing courses, teaching strategies, and on the educational merit of distance education techniques. Secondly, in their study in two US universities, Rockwell et al. (1999) examined incentives that encourage faculty to develop educational opportunities via distance and obstacles that discourage them from doing so. They found, *inter alia*, that administrators felt faculty concerns about teaching via distance related to the types of, and accessibility to training centred on using the technology and designing the instruction for distance delivery. And, thirdly, in a study of early-adopters of e-learning at a university, Wilson (1998) found that 39 percent saw the lack of technical training as constituting a major concern.

In a New Zealand study, Pajo & Wallace (2001) found that among faculty from the Colleges of Business, Science, and Education at Massey University, 56 percent identified lack of training and 45 percent a lack of knowledge/skills as constituting strong or very strong barriers to the uptake of Web-based technology.

Managers' survey

There was a consensus among e-learning managers as to the importance of tutors having access to professional development if they were to implement e-learning. As can be seen in Table 19, 17 of the 18 rated professional development as being critically or very important, the mean rating of 4.44 being among the very highest.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' access to professional development on e-learning curriculum development	9	8	1	0	0	4.44

Table 19. e-Learning managers' ratings of tutors' access to professional development as a driver of e-learning.

Case studies

Management and faculty in all three institutions recognised the urgent need for professional development that would provide tutors with the technological skills they need to fully utilise e-learning. To a lesser degree, managers and tutors were aware that the introduction of e-learning would result in changes to teaching and learning methodology and that this would create a demand for pedagogical professional development. One institution has begun to develop a formal, professional development plan that integrates the roles of its Centre for Learning Technology, Professional Development Unit and Human Resources Unit. In most

cases, the specific nature and timing of professional development has not yet been formalised. Faculty in two institutions stressed the need for adequate time for professional development and the need for institutions to provide support for students, as well as faculty. They also argued that programmes of professional development should be initiated by faculty, be based on faculty's perception of the needs of students and tutors, and designed to suit the needs of particular courses and programmes.

It's like there's this huge smorgasbord called e-learning in front of me and I get indigestion just looking at it because I don't know where to start, and I don't know which part of it's actually going to be the bit that's going to be most effective to enhance my learning environment for the students. (Case Study 3, p.54)

The way to manage [tutor uptake] is a good programme of staff development, and that's a big challenge for a lot of institutions (Case Study 2, p.34).

I prefer to have documented PD as well as hands-on training. Otherwise I feel as though I'm imposing on others' time if I have to ask for help. (Case Study 2, p.40)

It may even be that in the future, electronic curriculum learning materials are developed centrally and it's the teachers or facilitators that are in the regions. Automatically following a process where we try to turn all our current face-to-face tutors into electronic facilitators may not be wholly the way to go in the future. (Case Study 3, p.49)

It can't be happening in some courses and not in others, purely because of the tutor's lack of training and skills. (Case Study 3, p.53)

Analysis of policy documents

In support of the stated intention to develop e-learning strategies, five ITPs specifically included reference to providing professional development in e-learning for faculty. The five included two emerging e-learning ITPs, one large ITP with a well-developed current programme of e-learning courses and two medium sized ITPs. All other ITPs included more generalised references to the ongoing development and support of staff. Examples of references to professional development from the policies, included:

We will also begin to develop our e-learning capability, and we will strengthen our in-house professional development capability.

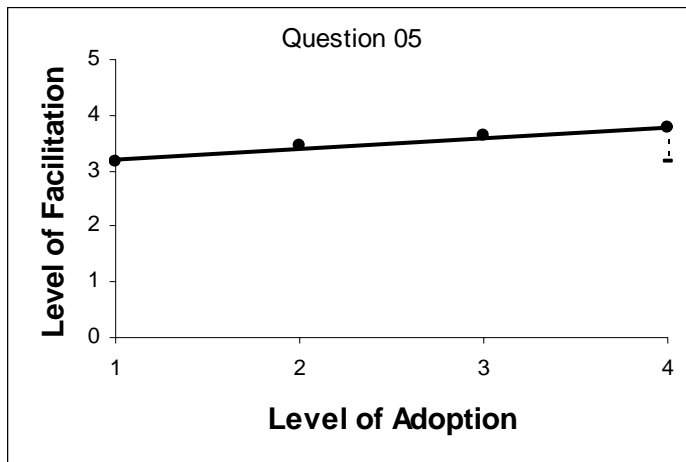
Put in place development programmes for staff to ensure that e-learning and flexibility of delivery lead to innovative and quality teaching and learning experiences.

Appropriate ICT competency will be a basic requirement for all positions, supported by a comprehensive training programme. This includes a rolling assessment of individual, team and organisational ICT training needs. More targeted training and development will also support strategic areas such as e-learning.

Tutors' survey

As shown in Figure 32, with a mean of 3.54, it seems that tutors in general considered their access to professional development focused on e-learning to be neither facilitating nor inhibiting, with a trend towards the former. The facilitation factor of 0.63 suggests a low positive relationship between tutors' levels of e-learning adoption and their ratings of access to professional development.

Figure 32. Effect of access to professional development for tutors to learn about e-learning curriculum development on their adoption of e-learning.



Mean for total sample: 3.54

Facilitation factor: 0.63

Conclusions and implications

Professional development policies and practices will be influenced by multiple factors and there is certainly no 'one size fits all' approach to the complex question of effective staff development for institutions and tutors engaging in online course development and associated staff professional development.

One factor to be taken into account is the development model that institutions choose to adopt for developing web-supported, blended, hybrid or fully online e-learning courses. As Table 2 in Chapter Two of this report notes, the majority of institutions surveyed have opted for either predominantly centralised management of e-learning (44.4%), or developed responsibilities within institute-wide integration (33.3%). Where institutions opt for a 'lone ranger' model, in which a course tutor is responsible for developing and delivering the online course with little other support or input, staff development for this type of model must be as multi-skilled and comprehensive as time allows. In other institutions (the majority surveyed) where central units provide a range of support including LMS software tutoring, educational design and web page development expertise, the main staff development focus for tutors should be on teaching content and pedagogical issues, as well as the design of effective learning activities for students.

Another factor is staff preferences for certificated or non-credit in-house skills-based training or a mixture of both. New Zealand now has a range of certificated courses offered by New Zealand educational institutions, for example the Graduate Certificate in Applied eLearning (Level 7) (Manukau Institute of Technology), the Graduate Certificate in Information Technology in Education (Waikato Institute of Technology), and the Post-Graduate Certificate in eEducation (The University of Waikato). A range of overseas qualifications up to specialist Master's degrees are available online, for example, the Master of Online Education offered by the University of Southern Queensland. Some overseas institutions have embedded these qualifications in their staff development requirements. At Monash University teaching staff are required to complete the first course of a Graduate Certificate in e-Learning as part of the probationary requirements for all new staff (Edwards, Webb & Murphy, 2000). At Palo Alto Community College completion of a full e-Learning certificate is required before faculty can teach online (Garza, Flores & Sosa, 2004).

The role of peer mentoring and facilitation is also a worthwhile strategy in a strategy mix of professional development and support for staff. This is discussed in more detail in the conclusions section discussing variable #23, 'support from, and modeling by, peers'.

Professional development specialists in e-learning for tertiary staff outline the following factors as essential when implementing a staff development programme: consideration of current staff experience in e-learning, customisation to tutor and institutional needs, tutors working as both learners and tutors, a mixture of face-to-face and online sessions, and an experienced facilitator (Prat & Palloff, 2004).

The literature, case studies, and some of the surveys of this report (with the exception of the tutor survey) identify effective professional development as a key factor in the adoption of e-learning by tutors. The challenge for institutions is to provide this for the majority of teaching staff in a timely and supportive way.

6.4 Variable #9: Provision of time to develop courses

Literature

In their study of factors that deter faculty from participation in distance education, O'Quinn, & Corry, (2002) pointed out that the development of distance education technologies has created conditions that require faculty to adapt to a new way of teaching and communicating with their students. Distance education, they asserted, requires not only that faculty learn how to use new technologies, but it also requires a paradigm shift in how educators orchestrate the act of learning. More important than just learning how to use the technology appropriately, faculty need to learn how to personalise their instruction and incorporate student involvement activities into their instruction. This change process takes time.

Four UK studies strongly suggest that time is a critical variable in determining the extent to which faculty adopt e-learning. Thus, in his study of university lecturers, Bennett (2001) reported that the lack of time was an important barrier to adopting new approaches to teaching. Similarly, Naidu (2003) found that time to develop materials was considered by faculty to be one of six major barriers to their employing web-based teaching. This is true even for faculty working in computing departments, as found by Newton (2003), who reported that 39 percent of his respondents noted time to develop materials as one of the main frustrations in using technology in teaching. And further, in a study of Scottish higher education institutions, Haywood et al. (2000) found that, in spite of the broadly positive views of the value of the learning technology, many serious barriers inhibit its widespread use by staff in their teaching; lack of time was listed among these barriers.

Several US studies support the above trends. For example, in a large-scale survey of US university personnel, Berge & Muilenburg (2000) found that when asked to rate barriers to distance education, the strongest of 64 nominated barriers was the increased time commitment (it must be noted, however, this variable was not further differentiated into preparation and delivery time). Similarly, Chizmar & Williams (2001) found that 54 percent of their respondents strongly agreed that the lack of time was the most critical barrier to their experimenting with technology in their teaching. These results are echoed in several other studies: Daugherty & Funke (1998), who found that the amount of preparation time required to create assignments figured among the most frequently identified barriers; Wilson (1998), who found that the top ranked concern among early-adopters of e-learning was sufficient time to develop and maintain course material; Rockwell et al. (1999), who found that university administrators felt that one of the main faculty concerns about teaching via distance related to the time needed for its preparation and delivery, with a related concern that time devoted to research will be sacrificed to accommodate distance teaching expectations; O'Quinn & Corry

(2002), who reported that lack of release time (and its correlate, concern about workload), emerged as the most inhibiting factors; and Schifter (2000), who found that lack of release time and concern about faculty workload comprised two of the top five factors that inhibited faculty from participating in asynchronous learning networks.

Two New Zealand studies echo the above results regarding the importance of considering adequate preparation time as a critical variable. Thus, Barr (2000) reported that faculty who participated in the University of Waikato's Mixed Media Programme agreed that planning and organising courses took more time. In their Massey University study, Pajo & Wallace (2001) found that time required to learn how to use the technology was perceived as the most significant barrier to adopting e-learning, 72 percent rating it as a strong or very strong barrier.

Managers' survey

As with the previous variable, professional development, there was a consensus among e-learning managers as to the importance of tutors having adequate time to learn about and develop material if they were to implement e-learning. As can be seen in Table 20, all 18 respondents rated this as being critically or very important, the mean rating of 4.44 being among the very highest.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/ no importance</i>	<i>Mean</i>
Adequate time for tutors to learn about & develop material for e-learning	8	10	0	0	0	4.44

Table 20. e-Learning managers' ratings of tutors' time to learn about and develop material as a driver of e-learning.

When asked for their opinions on the extent to which various factors constituted barriers to the uptake of e-learning in *their* institutions, the e-learning managers expressed views consistent with the foregoing, with all but one of the 18 respondents rating a lack of time for tutors to develop courses as a moderate, significant or major barrier (see Table 21).

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Lack of time for tutors' to develop e-learning courses	0	1	5	6	6	3.94

Table 21. e-Learning managers' ratings of the extent to which tutors' time to develop e-learning courses constitutes a barrier.

Case studies

Provision of sufficient time to develop new e-learning courses was a major issue for faculty in the first institution in the case study. In this institution, the largest in the study and the most experienced in terms of e-learning, faculty regarded the time involved in this process as a major deterrent to adopting e-learning. They claimed that management greatly underestimate the time it takes to set up new courses or to modify existing courses and they are very concerned that management will not allow enough time for this in the future.

In a second institution, management and faculty were aware, from the experience of other providers, that the development of digital material could increase the time spent on the

development of course material and they admitted that this could be problematic. However, the limited experiences of the institution and of individual tutors in the development of digital material, meant that neither management nor faculty had any clear idea about how much time would be needed in developing e-content for courses.

In the third institution, management asserted that while tutors might be concerned about the additional time needed to develop courses, this was only because they were new to technology. Managers argued that experience showed that introducing technology reduces workloads in the long-term, so using technology would increasingly become less of a burden. Faculty in this institution expressed no concern about the additional time needed to develop courses.

I supported staff in the past in setting up on-line and Web CT systems. The time factor was severely underestimated and the workload should be noted. (Case Study 1, p.24)

It takes more time and it's time that you're not credited for, it's extra time. (Case Study 1, p.24)

We're not just saying, 'I just don't feel like it', you know. It really is the amount of time you need to do it. I don't think anybody is allocated that amount of time. (Case Study 1, p.23)

We've been thinking for a long time of developing our courses and getting some of them on-line but then we get to the reality of organising the time and the resources and getting the advice, along with the normal timetable that we're committed to, you just think, 'Oh, I'll do that later,' and it rarely gets done. (Case Study 1, p.23)

It raises issues for management in terms of how we measure teaching hours. At the moment our workload is defined by this magical class contact hours. (Case Study 3, p.56)

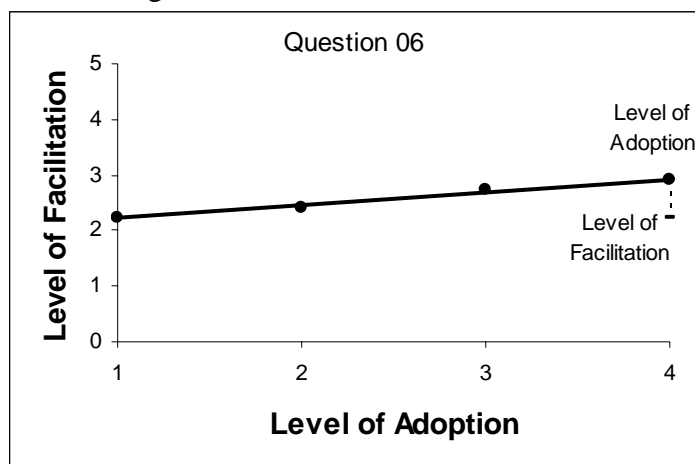
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

The availability of adequate time to develop e-learning courses scored the lowest of the 30 variables for the sample as a whole, the mean of 2.60 indicating that tutors generally found this to be inhibiting. The low positive facilitation factor (0.58) indicates that time was an issue across the board, even for Embracers (see Figure 33).

Figure 33. Effect of adequate time to develop material for e-learning courses on their adoption of e-learning.



Mean for total sample: 2.60

Facilitation factor: 0.58

Conclusions and implications

Faculty surveys reported in international papers and studies unanimously list lack of time to develop courses as a major barrier to the adoption of e-learning. In many studies, 'time to develop courses' is listed as the most important barrier (see, for example, Bennett, 2001; Berge & Muilenburg, 2000; O'Quinn & Cory, 2003). Tutors surveyed in this project held similar views but it would appear that time to develop courses is not yet the major issue in New Zealand that it is in Europe and North America. In the case studies, tutors expressed the opinion that management were unaware of the true cost and effort involved in developing new courses. However, this view is belied in the e-learning managers' survey where 'lack of time for tutors to develop e-learning courses' was listed as the second most important barrier to introducing e-learning. Management also recognised the need for 'adequate time for tutors to learn about and develop material for e-learning.'

This study and international studies like it indicate that lack of time to develop courses is certainly one of the more important issues in determining faculties' readiness to adopt e-learning. The concern that changing to e-learning will result in an increased and unrecognised workload is an important issue for faculty. Management need to ensure that faculty know that they are aware of this concern. Management need to demonstrate to faculty that they are aware of the need for allocated time to develop courses and course material, perhaps by reviewing workload policies in the manner described by the management of 'Polytechnic Z' in the case study section of this study.

6.5 Variable #10: Provision of time to deliver courses

Literature

Just as time to prepare for e-learning has emerged as a critical factor in determining its level of adoption by faculty, so, too has time to deliver it.

For example, in a survey of faculty who taught online in a US university, Mckenzie et al. (2000) found that among the most frequently mentioned barriers were the lack of time to deliver such courses and the heavier workload with teaching on-line. As noted in the previous section, Rockwell et al. (1999) found that administrators felt faculty concerns about teaching via distance included the time needed for the preparation and delivery of such courses, with the related concern that time devoted to research will be sacrificed to accommodate distance teaching expectations. Conversely, 57 percent of the faculty considered that release time would be an incentive for them to undertake such teaching. In a similar vein, Wilson (1998) found that one of the major concerns among a sample of early-adopters of e-learning was a lack of time to interact with students in web-based courses.

Findings from three New Zealand studies are also relevant. In one of these, Barr (2000) found that faculty involved in the University of Waikato's Mixed Media Programme saw no major disadvantage to working online except for the additional time involved in dealing with the students. Faculty agreed that teaching MMP courses took much more time than teaching equivalent courses on campus, some claiming it took up twice as much time. They noted that the greatest demands on their time came from responding to questions and problems from students. While many agreed that they could cope with this by organising their time more effectively, they agreed that when unexpected e-mails from students arrived, they tended to answer them almost immediately. Not surprisingly, in a second study of the same programme, Donaghy & McGee (2003) found that faculty considered that online teaching was more time-consuming, citing reasons such as the necessity to know the readings in depth and to spend more time motivating students. In a third study Pajo & Wallace (2001) reported that 57 percent of their respondents reported that time required to use and monitor e-learning was a strong or very strong barrier to its use.

Managers' survey

Table 22 shows that the e-learning managers considered tutors' perceptions that adopting e-learning would not unduly impact on their out-of-office time was very important or moderately important in their decisions to adopt it.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' perception that e-learning will not unduly impact on out-of-office time	0	11	4	3	0	3.44

Table 22. e-Learning managers' ratings of tutors' perception that e-learning will not unduly impact on their out-of-office time as a driver of e-learning.

Case studies

Tutors in Case Study One did not believe that teaching courses via e-learning involved less time, many arguing that it involved more time. In Case Study Three, neither management nor faculty had any clear idea about how much time would be needed to teach e-learning courses, but both were aware that individual tutor workloads would be affected by the introduction of e-learning and the associated growth of tutor-student communication. In Case Study Two, management asserted that once courses were running, they would take less time to teach. Faculty, on the other hand, had no clear idea about how much time would be needed.

Every group that we've talked to have said the disadvantage with e-learning is that it takes much longer. (Case Study 1, p.23)

e-Learning just adds another complexity to the question of how we find a way to equitably assign workload. (Case Study 3, p.56)

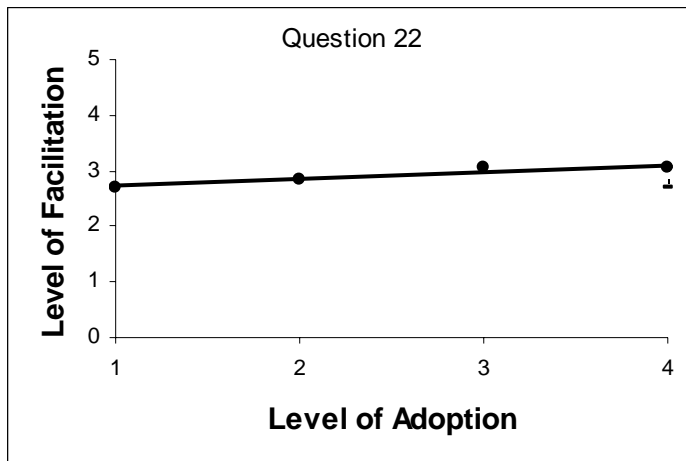
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

Tutors' perceptions of the impact of e-learning on their out-of-office time was rated fourth equal lowest of the 30 variables, the mean of 3.04 trending it towards being an inhibiting factor. The low facilitation factor (0.30) showed that there were negligible differences among the ratings of this variable made by tutors according to the four levels of adoption. In other words, there was a general concern about the effects of e-learning on tutors' discretionary time.

Figure 34. Effect of tutors' perception that e-learning will not unduly impact on their out-of-office time on their adoption of e-learning.



Mean for total sample: 3.04
Facilitation factor: 0.30

Conclusions and implications

Managers surveyed in this project acknowledged the need for additional time to prepare courses, but time to deliver courses was not regarded as an important issue. In the manager interviews it was, in fact, suggested that as technology becomes more user friendly, delivery of courses will become simpler. The tutor survey did not differentiate between 'time to learn about and develop courses' and "time to deliver courses." However, in their interviews, tutors commented that some e-learning tools took longer to use than traditional methods and it was generally accepted that communication with students involved more time in e-learning courses than in conventional courses.

It is generally recognised that time to develop new course material is a major issue in an institution's adoption of e-learning. It obviously takes time to modify course material and resources, to learn to cope with unfamiliar equipment and teaching techniques and to develop new student-tutor roles to suit the demands of a new pedagogy. The issue of time to actually teach courses using e-learning is less apparent. In New Zealand, two research projects, Barr (2000) and Donaghy & McGee (2003), found that faculty teaching courses online spent considerably more time delivering their courses than faculty teaching the same courses on campus. International researchers like McKenzie et. al. (2000); Pajo and Wallace (2001) and O'Quinn & Cory (2002) make similar claims. However, most of this research lacks specific detail, faculty commenting that 'planning, preparation and delivering courses takes more time.' 'Planning and preparing' can be equated with 'developing', and while it is acknowledged that these take time, it is unclear from these surveys whether or not the actual delivery of courses takes more time. This is especially true if we eliminate factors like 'communication with students'.

The lack of hard data bearing on this issue is problematic. A significant number of tutors claim that delivering a course using e-learning takes longer, but apart from the additional time taken to communicate with students on e-learning courses, there is little evidence to verify this. Because workload concerns are certainly going to be an important adoption issue, it behoves management to ascertain, either through research or through observation, whether or not it does take significantly longer to teach a course using e-learning. If it can be shown that teaching using e-learning does take longer, institutions need to identify those aspects of e-

learning that cause this and either modify courses accordingly or compensate faculty in some way.

6.6 Variable #11: Provision of financial resources for running costs

Literature

e-Learning is by no means cost neutral. To succeed, it means that institutions have to be prepared to invest more than for traditional courses – at least for start-ups. Some of these costs (e.g., the provision of professional development, investment in technology, release time for the preparation of courses) are alluded to in other sections of the model, but there are also other running costs to be considered. Thus, Betts (1998) found that the top five inhibiting factors that inhibited faculty from participating in e-learning a lack of grants for materials/expenses. Similarly, in a comprehensive survey of teaching faculty, administrative staff, and support staff, Berge & Muilenburg (2000) found that lack of money to implement e-learning was rated in the top five (of 64) barriers. In the same vein, Chizmar & Williams (2001) reported that 54 percent of their sample of faculty across four US campuses rated the lack of campus grant funds to support the development of instructional technology as a major deterrent to its adoption. Other studies reporting on the importance of devoting adequate resources to the running costs of e-learning include Dooley & Murphrey (2000), O'Quinn, & Corry (2002), and Schifter (2000).

The study

This issue was not directly addressed in the surveys conducted in the present study, but participants in the case studies made relevant comments:

Participants in all three of the institutions studied were aware of the need to adequately resource the introduction of e-learning. This involves providing funding that would finance professional development opportunities, provide time for tutors to create digital material and provide a reliable technical infrastructure. Because two of the institutions were in the early stages of e-learning development and have limited financial resources, no specific financial policies were outlined in interviews. The third institution was developing a long-term plan that makes provision for professional development and new buildings and infrastructure. This plan will allow the institution to plan ahead for at least the next ten years.

Implications

Costing models by such experienced practitioners such as Bates (2000) and Twigg (2004) provide some indication of the total costs involved in a successful e-learning implementation. For most New Zealand ITPs e-learning is a supplemental activity which will continue to be funded in a marginal way for many smaller institutions, making collaboration with other institutions an effective way to produce economies of scale in many of the essential cost areas.

6.7 Variable #12: Provision of administrative support/pressure

Literature

Several studies have emphasised the important role played by the support (and sometimes pressure) provided by institutional administrators in influencing faculty to adopt e-learning. In their analysis of 32 published in-depth case studies of leading organisations concerned with identifying the barriers to using distance education, Cho & Berge (2002) found that 14 of them identified a cluster of variables under the heading of administrative structures. These were:

Lack of credibility for distance education within a particular administrative structure, and lack of money can be problematical for distance education. Competing with, or using, new

business models can cause difficulties, too. When partnerships are formed among different units within an organisation, or among different organisations, lack of agreement concerning such issues as revenue sharing, regulations, tuition and fees, as well as scheduling, FTEs, and issuance of credits can become obstacles to distance education.

Bennett (2001) found that in his study of faculty in UK universities there was general agreement with the proposition that ‘The University’s management has forced me to adopt new teaching technologies and methods’ (mean of 4.04 on a 5-point Likert scale). However, caution must be exercised in drawing any conclusion that this is the way to go for, as Hagner & Schneebeck (2001) emphasise, the process is important and the more initiatives that are imposed from above, rather than being a constructive and collaborative effort, the slower the process will be.

Other studies that have highlighted the role of administrative support include Berge & Muilenburg (2000), Betts (1998), Butler & Selborn (2002), Donaghy & McGee (2003), Daugherty & Funke (1998), Haywood et al. (2000), Redman & Kotrlik (2004), Wilson (1998), and Wilson (2001)

Managers’ survey

When asked to give their opinions as to senior management’s support for e-learning, all but one of the e-learning managers rated it as being from moderate to critical importance (mean 3.83):

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors’ perception of senior management’s support for e-learning	6	5	6	0	1	3.83

Table 23. e-Learning managers’ ratings of tutors’ perception of senior management’s support as a driver of e-learning.

However, when a question was more explicitly focused on the extent to which they considered a lack of support from management in *their* institution constituted a barrier, 10 of the 18 e-learning managers considered it to be no more than a moderate barrier (mean: 2.89):

Factor	<i>Major barrier</i>	<i>Significant barrier</i>	<i>Moderate barrier</i>	<i>Minor barrier</i>	<i>Not a barrier</i>	<i>Mean</i>
Lack of support from mid-level managers (eg, Faculty, Department Heads)	0	8	3	4	3	2.89

Table 24. e-Learning managers’ ratings of extent to which support from mid-level managers constituted a barrier.

Case studies

Management in two of the institutions expressed their general intentions to provide administrative support, but this need was expressed in general terms and the nature of the support was not specified. In the third institution, management had initiated plans to reorganise support units and faculty to co-ordinate training and staff development.

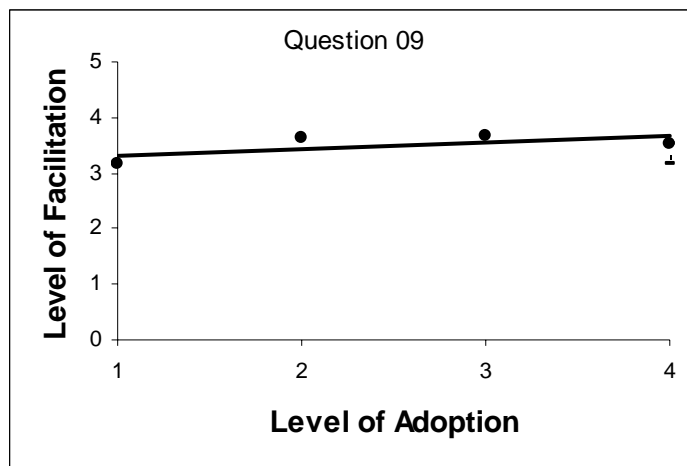
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

As portrayed in Figure 35, the effect of management support for e-learning was rated by tutors as having neither a facilitating nor an inhibiting effect on their uptake of e-learning, but with a trend towards the former effect (mean of 3.60) The facilitation factor of 0.46 suggests that there is only a low positive relationship between tutors' levels of e-learning adoption and their ratings of management support.

Figure 35. Effect of senior managements' support for e-learning on tutors' adoption of e-learning.



Mean for total sample: 3.60

Facilitation factor: 0.42

Conclusions and implications

These results indicate that while there is a role, particularly in relation to senior management, for administrative support of e-learning, there are also implications that neither senior management support, nor 'top down' pressure from senior management for implementing e-learning, are necessarily crucial in the implementation of e-learning.

6.8 Variable #13: Provision of technical support*Literature*

It is almost self-evident that the successful implementation of e-learning is highly dependent upon the provision of adequate technical support. Several studies report findings in this direction. For example, in a large-scale UK study, a consortium of research organisations led by the Social Informatics Research Unit at the University of Brighton (2003) found that in Further Education and Higher Education institutions in the UK, there was considerable unanimity across the sector about what are the major constraints on and barriers to further developments in managed learning environments. The top five constraints, or barriers, included the lack of support staff. In a second large-scale survey, Haywood et al. found that among academic staff from all Scottish higher education institutions, in spite of the broadly positive views of the value of the learning technology, many serious barriers exist which inhibit the widespread use of e-learning by staff in their teaching. These difficulties included lack of reliable and adequate infrastructure, including technical support. Also in the UK, Bennett (2001) found high agreement among university faculty with the proposition that 'The

University does not have the facilities to enable the effective implementation of IT-based teaching methods’.

In the US, Cho & Berge (2002) presented a content analysis of 32 published in-depth case studies of leading organisations to identify the barriers to using distance education. Prominent among these studies were the 11 that drew attention to the importance of technical expertise, support and infrastructure. Such studies had in common the following description:

It is difficult to keep up with the fast pace of technological change. Many instructors lack the knowledge and skills to design and teach distance learning courses, yet their organizations lack support staff to assist with technical problems, to develop distance learning course materials, or to provide distance learning training. The technology-enhanced classrooms or laboratories and the infrastructure required to use them may not be available.

In another US study, Betts (1998) reported that when asked what their university’s policy on distance education should be, five prevalent policy recommendations emerged from faculty who were actively involved in e-learning. These included the assurance of technical support. Reciprocally, the top five inhibiting factors for this group included the lack of technical support. Among faculty who did not participate in distance education, their overall reasons for not becoming involved also included concerns about a lack of technical support. Similar results have been reported in US studies conducted by Berge & Muilenurg (2000) Brown & Czerniewicz (2004), Chizmar & Williams (2001), Daugherty & Funke (1998), Giannoni & Tesone (2003) Schifter (2000), Redman & Kotlik (2004), Simmons (2002), and Wilson (1998).

In a New Zealand study, Pajo & Wallace (2001) found that 50 percent of university faculty rated inadequate technical support as a strong or very strong barrier.

Managers’ survey

When asked to give their opinions as to the importance of technical support for tutors in developing and in delivering e-learning courses, and students’ access to libraries Table 25 shows that the bulk of the e-learning managers rated the first two as being critically or very important (means of 4.28 and 4.17, respectively) and the third as moderately to very important (mean 3.72).

<i>Factor</i>	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
The availability and quality of technical support for tutors in <i>developing</i> e-learning activities	8	7	3	0	0	4.28
Availability and quality of technical support for tutors in <i>delivering</i> e-learning courses	8	6	3	1	0	4.17
Students’ access to library and other on-campus resources	5	7	3	2	1	3.72

Table 25. e-Learning managers’ ratings of tutors’ perception of technical supports as a driver of e-learning.

Case studies

Tutors in all three institutions expressed concern about their technological competence and the lack of a robust technical infrastructure. The three institutions were committed to improve this situation, but the specific nature of this support was not specified.

If the Institute is serious, they have to give us support. ... What I'm saying is, if they want us to come to the party, they've got to support it. (Case Study 1, p.21)

What I need is a manager that as part of their repertoire says, 'Have you thought about e-learning? Are you thinking about it? What do I need to do to support anything that you might want to do?' That sort of approach from a manager really helps me, but I don't hear that. (Case Study 3, p.53)

You need the whole infrastructure in place to support it, both within the institute and to provide access from outside. It should be something that's absolutely transparent for any of the students rather than for the few technically gifted. (Case Study 3, p.54)

The techno people know heaps of techno stuff and we don't know that, so we can't actually always talk to them. We can't get our grievances dealt with because we don't speak the same language that they speak. So I think those in-between people, those mediators, are really important. (Case Study 3, p.54)

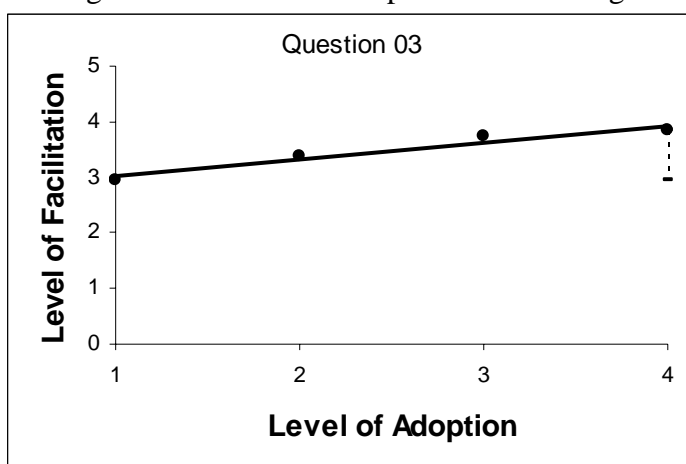
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

With a mean of 3.55, it seems that tutors in general considered the availability and quality of technical support to develop e-learning activities to be neither facilitating nor inhibiting, but with a trend towards the former (Figure 36). The facilitation factor of 0.40 suggests a low positive relationship between tutors' levels of e-learning adoption and their ratings of access to technical support to develop e-learning courses.

Figure 36. Effect of availability and quality of technical support for tutors to *develop* e-learning activities on their adoption of e-learning.



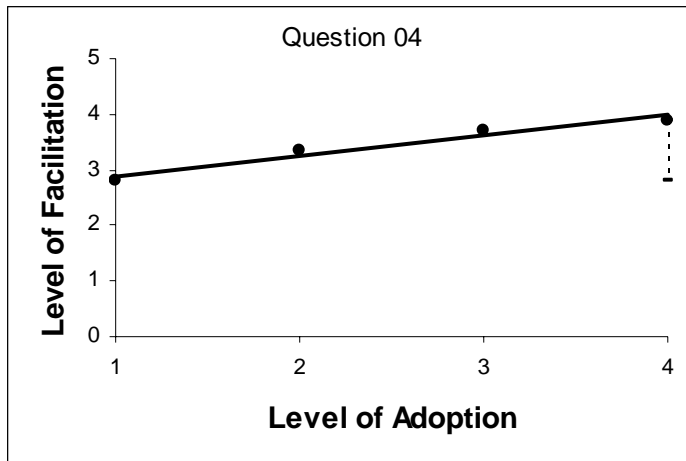
Mean for total sample: 3.55

Facilitation factor: 0.40

Not surprisingly, a similar pattern to the previous variable occurred for tutors' ratings of support to *deliver* e-learning activities. Thus, with a mean of 3.53, it seems that tutors in

general considered the availability and quality of technical support to deliver e-learning activities to be neither facilitating nor inhibiting, but with a trend towards the former. The facilitation factor of 1.0 was higher than in the previous variable and suggests a moderately positive relationship between tutors' levels of e-learning adoption and their ratings of access to technical support to deliver e-learning courses.

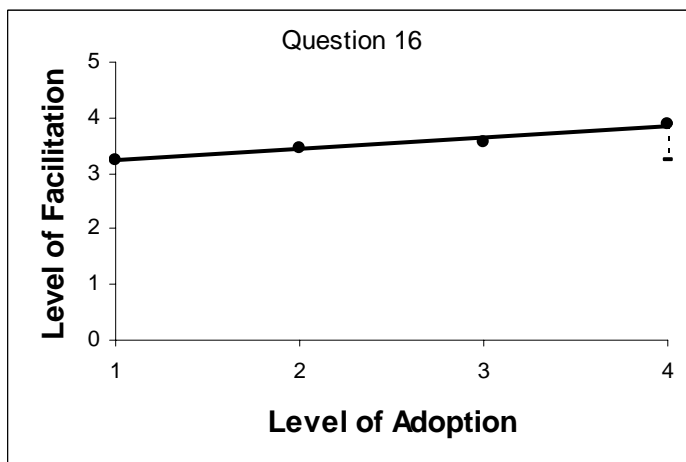
Figure 37. Effect of availability and quality of technical support for tutors to *deliver* e-learning activities on their adoption of e-learning.



Mean for total sample: 3.53
Facilitation factor: 1.00

Turning to the impact of technical support for students, with a mean of 3.53 and a facilitation factor of 0.88, this variable was very similar to the previous one.

Figure 38. Tutors' perceptions of the impact technical support for student's e-learning (e.g., Help Desk services) on their adoption of e-learning.



Mean for total sample: 3.53
Facilitation factor: 0.88

Conclusions and implications

Overall the findings of the study indicate the importance of providing comprehensive technical support for developing and delivering e-learning, the strongest support coming from the literature, e-managers' survey and case studies, with the tutors' survey less emphatic in supporting this provision.

6.9 Variable #14: Provision of pedagogical support

Literature

e-Learning, in its most sophisticated form, goes well beyond merely transferring material taught in a face-to-face context onto computers. Rather, it requires significant changes to pedagogy to make effective use of online tools. For example, it means using computers to establish 'virtual learning communities' where knowledge, ideas and perspectives can be freely shared and analysed; using computers to provide maximum opportunities for dialogue between teachers and their students and among their students; and actively encouraging students to engage in web-based research. In a word, for many faculty, e-learning means transforming the way they teach, a process that may well require expert pedagogical support. This point is emphasised by Hagner & Schneebeck (2001), particularly in relation to the group they refer to as 'the risk averse' who lack the technical expertise to make the transition. Wilson & Stacey (2004) provide a detailed prescription of how pedagogical support should be adapted to the levels of need and/or readiness levels of academic staff. For example, staff at Level 1, described as beginners or novices who lack familiarity with online teaching and lack experience with technology in teaching, need to be helped to identify opportunities to use technology effectively through 'Show and Tell' activities, operational training, short seminars on current activities within the institution, guest speakers, and exemplars. In contrast, those at Level 3, are described as wanting to try things out and wanting to use online learning environments, but still may have limited skills and exposure to technology in teaching. They need guidance in applying the processes at Levels 1 and 2, plus a focus on more complex technical knowledge, more complex forms of online interactivity (e.g., collaborative group learning), and being prepared to handle problems of more intensive online discussions. Staff at Level 4 could become role models for others, acting as resources for other staff and providing advice.

The necessity to address the need for pedagogical support came through in Pajo & Wallace's (2001) Massey University study in which they found that 40 percent of the respondents cited a lack of teaching support as being a strong or very strong barrier to them adopting e-learning.

This issue was not directly addressed in the surveys conducted in the present study. It overlaps with independent variable # 8, the provision of professional development for faculty. However, participants in the case studies made relevant comments:

In all three case studies, faculty stressed the need for their institution to demonstrate the pedagogical value of e-learning. Institutional managers were aware of this need and most had provided some faculty with opportunities to attend national e-learning events. Tutors and management in the three institutions were aware that any change to e-learning will require a change to more student-centred models of teaching and learning, although it was not clear that the exact nature of these changes had been fully explored. Management were committed to providing ongoing pedagogical support, although the specific nature of this support was not specified.

Tutors may have to change their teaching style. They've certainly got to adapt, but you learn that by being a student first and actually doing the interaction as a class before you realise what it takes to be a tutor in that environment. (Case Study 1, p.26)

It's got to be right from both an educational point of view and a technical point of view, so the people that do that sort of work need to be educators not just technicians. You know, with a strong background in education and the right [technological] skills too for the project. (Case Study 1, p26)

It's to do with the systems and the gatekeepers who look after those systems, who control the capacity of those systems and divvy out that capacity to different people. They also

need to be aware of some of the educational values that we are trying to push here. I mean, they need to be part of it. (Case Study 3, p.54)

There appears to be a desire from teaching staff that management move from a silo approach of teaching is teaching and technical problems are technical problems to pursuing the introduction of e-learning in a holistic way where technical and pedagogical concerns are addressed in a holistic way. (Case Study 3, p.54)

By introducing new technology you actually reflect on your own practice, on how you do things, and so you start thinking more about your teaching and you start developing new ways of doing things. (Case Study 2, p.40)

Conclusions and Implications

Two issues are involved in this variable: firstly do managers and faculty recognise the need for pedagogical change and secondly does management plan to provide professional development that will facilitate pedagogical change? It is apparent from the e-learning managers' survey and from the case study interviews that management is aware of the need for change. In the latter, managers were generally convinced of the pedagogical advantages of e-learning and recognised that applying conventional teaching methods to e-learning was not an option. One manager commented, 'e-Learning will not become pervasive until tutors embrace different approaches to teaching and learning' (Case Studies report, p.13).

The tutors' survey indicated that recognition of the pedagogical benefits of e-learning differed greatly between high adopters and low adopters. It would appear that institutions need to focus on low adopters when designing and providing pedagogical professional development. Because low adopters need to be convinced of the need for pedagogical change, professional development should be applied at the departmental level by relating it to particular courses and activities. Managers are aware that tutors need time to reflect before embracing e-learning and that new pedagogies will be more readily adopted when their efficacy can be demonstrated. Management are generally committed to such pedagogical support. One of the three case study institution has the beginnings of a professional development programme already in operation and the others have plans in place.

The case studies suggest that most tutors are amenable to pedagogical change. In their interviews, many tutors commented that changing teaching methods in order to improve student learning was something that good teachers do all the time. In this respect, tutors' opinions reflect Bennett's (2001) research. He claims that the main triggers causing people to want to know more about new teaching methods involve the belief that these methods make the learning experiences of students more interesting and effective. Tutors do, however, demand proof that new methods will result in improved educational outcomes. Standards and course quality are important issues and tutors were insistent that change should not result in lower standards.

Wilson & Stacey (2004) point out that rates of adoption will increase when innovation indicates an advantage over current methods, makes life simpler, is compatible with existing needs and expectations, can be tried without commitment and when it is observable and visible. International research also points out that programmes of professional development to introduce new pedagogies are more likely to succeed when practitioners have time to learn about and develop material. Peer pressure is an inducement to accept new methods. This points to the desirability of management identifying within its teaching staff a handful of influential individuals whose support could be enlisted as mentors. This approach would accommodate to Hagner & Schneebeck's (2001) claim that the more initiatives are imposed

from above, the slower change will be. This attests to the need for faculty involvement in collaborative and cooperative professional development.

6.10 Variable #15: Negotiation of appropriate contracts, job security, workloads, consideration of time taken from research

Literature

The impact of e-learning on contractual arrangements has received attention in the literature. Two areas in particular have been studied: job security and workload. The first of these, job security, has been focused on in three reports. In their study of administrators, faculty, and support units in a US university Dooley & Murphrey (2000) found that all three groups noted career and job security as a threat, with faculty perceiving it as their most prominent threat. Somewhat contrary findings were reported in two other studies. In the first of these, Giannoni & Tesone (2003) attempted to determine factors that inspire senior faculty members to participate in course delivery through online learning environments. They found that job security was rated the least important in a list of 10 factors. In the second study, Pajo & Wallace (2001) found that among faculty at Massey University concerns that technology will replace teachers and was a threat to their job security rated very low as barriers to the adoption of e-learning. Only 9.6 percent and 7.4 percent, respectively, rated these two concerns as strong or very strong barriers. Perhaps reflecting the results of the latter two studies, Berge & Muilenburg (2000) found that of the 64 barriers to e-learning, existing union contracts received a very low rating, scoring 63rd.

Workload concerns is the second contract-related issue to have been investigated. For example, in Schifter's (2000) study of factors that motivate or inhibit faculty to participate in asynchronous learning networks, she found that concern about faculty workload rated among the top five inhibiting factors, both for participants and non-participants. A similar result was reported from a study carried out by O'Quinn, & Corry (2002), who analysed the degree to which a set of 30 factors may have inhibited faculty's participation in distance education at a community college in the US. Concern about faculty workload attracted a high level of agreement (mean of 3.92 on a 5-point Likert scale). In another study, carried out by Wolcott & Betts (1999) at four US universities, workload associated with e-learning emerged as a major concern for faculty. They note, however, that the respondents were not always in agreement as to how workload should be configured: should distance teaching be part of one's assigned teaching load or treated as "overload"? Participants divided into two camps on this issue: those who said that distance teaching was "just part of the assignment," and others who viewed distance teaching as "above and beyond" assigned teaching responsibilities. In an innovative study, Zemsky & Massy tracked aspects of e-learning in six US universities over a period of 15 months. The participants comprised faculty (mostly early adopters) and administrators in each institution. One of the issues they tracked was the extent to which faculty overload was responsible for the reluctance of some to experiment with e-learning? Among the faculty (who were mostly early adopters), 13 percent found a negative change over the 15 months, while only 1 percent noted a positive change. These findings draw attention to the possible volatility in the field of e-learning and the need to interpret 'snapshot' information cautiously. If, as seems clear, workload is an issue, what is being sacrificed? One answer to this question has been suggested in research carried out by Rockwell et al. (1999), in which they examined incentives that encourage faculty to develop educational opportunities via distance and obstacles that discourage them from doing so. In their study of two colleges in a US university, they found, *inter alia*, that 61 percent of faculty were concerned that e-learning would take time from their research.

Managers' survey

The e-learning managers' survey addressed two questions of relevance. Firstly, the managers were asked to rate the degree of importance tutors would attach to collective employment agreements in influencing their use of e-learning. From Table 26 it can be seen that the opinions on this factor were spread across the range, with a mean score of 3.33 placing it in the moderately important category.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Collective employment agreements that acknowledge e-learning activities	1	8	6	2	1	3.33

Table 26. e-Learning managers' ratings of tutors' perception of collective employment agreements acknowledging e-learning as a driver of e-learning.

Secondly, the managers were asked to what extent tutors' views that their conditions of employment did not adequately recognise requirements of e-learning acted as a barrier. As shown in Table 27, opinions on this factor were also spread across the spectrum, with the mean score of 2.83 placing it towards the high end of the moderate barrier category.

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Tutors' view that their conditions of employment do not adequately recognise the requirements of e-learning	1	5	5	4	3	2.83

Table 27. e-Learning managers' ratings of extent to which tutors view their conditions of employment as a barrier.

Case studies

While tutors in the largest institution in the case study were enthusiastic about adopting e-learning in at least part of their course work, many were openly cynical about management's motives in encouraging such adoption, particularly when this involved putting whole courses online or on an LMS. Many argued that management's policy of encouraging e-learning was part of a broader plan to increase student numbers while reducing faculty numbers. Often they argued that management's enthusiasm for e-learning was misplaced because they were unaware of the real costs and effort involved in developing and teaching e-learning courses. Some interviewees expressed real concern about the way this perceived policy might affect the retention of their jobs. Institutional managers and faculty in all three institutions were conscious that the introduction of e-learning would create new demands on tutors. Some were monitoring national initiatives, such as the ASTE conference. Institutional policies could be shaped by the outcomes of these initiatives and others like them.

Often the executive or management get the wrong idea. They see e-learning not as something that can improve the experience for students and trying to keep up with the 21st Century, it's seen as a way of increasing revenue. (Case Study 1, p.20)

I think there's something that people don't clearly understand, I have heard the term 'redundancy' used on the part of some of my younger colleagues. You know, what's going to happen to me in a few years' time? (Case Study 1, p.20)

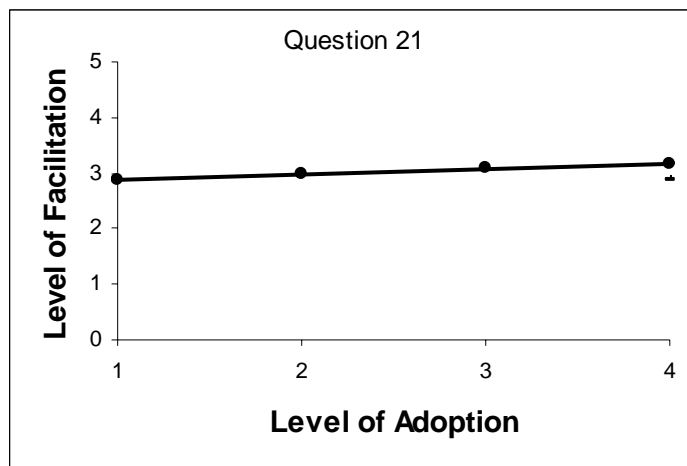
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

The presence of collective employment agreements that acknowledge e-learning was rated fourth equal lowest of the 30 variables, the mean of 3.04 trending it towards being an inhibiting factor. The very low facilitation factor (0.17) showed that there were negligible differences among the ratings of this variable made by tutors according to the four levels of adoption (Figure 40).

Figure 40. Effect of collective employment agreements that acknowledge shifts towards e-learning activities on tutors' adoption of e-learning.



Mean for total sample: 3.04

Facilitation factor: 0.17

Conclusions and implications

International literature is ambiguous on the issue of job security. Some reports, like those of Dooley & Murphrey (2000), report that faculty, administration, and support staff see the introduction of e-learning as a threat to their job security. However, in other reports, like those of Gianoni & Tesone (2003) and Berge & Muilenburg (2000), faculty rated job security among the least important inhibitors to adoption. In our study, the e-learning managers' survey was similarly inconclusive. The tutors' survey indicated an awareness of the need for greater flexibility as e-learning is introduced. However, issues like flexible hours, recognition of out-of-office time and incentives and rewards were not yet the critical issues they are in some North American and European institutions.

Increased workload is a more important issue for faculty. This is apparent in data from international surveys and from the current project. A number of tutors in the case studies expressed concern about the possibility of redundancies resulting from a change to e-learning and there was a widely held view that management regarded e-learning as a way of increasing student numbers without any corresponding increase in faculty numbers. As discussed in the commentary on variables #9 and #10, faculty felt that management were generally unaware of the additional time needed to develop and deliver e-learning courses. One tutor commented, 'It's kind of invisible time because you're just sitting at your computer and you're not doing anything as far as someone else is concerned, so there is not the same kind of understanding of the time factors that are involved' (Case Studies Report, p.56). Tutors expressed real concern that hours spent on professional development, course development and preparation

were not recognised in institutions where employment conditions are based almost exclusively on contact hours.

Management need to assure faculty that job security is not a concern, if this is indeed the case. Workload appears likely to become an important issue and it promises to be difficult to resolve. The surveys indicate that management are aware of the additional workload that could become part of introducing e-learning. It seems clear that they will need to implement this awareness by making provision for the time it takes to develop e-learning courses. This time needs to be quantified and written into contracts. Workload policies may also need to be modified so that hours other than contact time are taken into account.

As discussed in variables #9 and #10, it might be useful for institutions to undertake some research that would allow management to quantify time spent designing, developing and delivering e-learning courses. Workload issues are particularly important at a time when ITPs are beginning to promote research, especially in the PBRF climate.

6.11 Variable #16: Resolution of legal issues, eg intellectual property rights

Literature

As tutors become involved in e-learning, they will be involved in developing materials that may well become the focus of intellectual property rights, with the need to resolve the extent to which ownership is vested in them personally, their employing institution or is shared in some way. In a review of the literature, Deaton & Singleton (2004) lists intellectual property rights as a disincentive to faculty choosing to teach online. For example, in their study of how the perspectives of administrators, faculty, and support units in a US university impact on the rate of distance education adoption, Dooley & Murphrey (2000) found that there was limited knowledge on copyright and intellectual property issues. Faculty in particular expressed a fear that if their institution captured their intellectual property, that might eliminate positions. However, a second study, by O'Quinn, & Corry, (2002) suggested that this was not a major inhibitory factor. In their study of division chairs and faculty at a community college in the US, they found that there was general disagreement with the proposition that lack of royalties on copyrighted materials deterred faculty from participating in distance education. It was not made clear whether this was because this issue had been resolved to their satisfaction or that the faculty was simply unconcerned about it. A similarly low rating of this matter was reported by Wilson (1998), in her study of early-adopters of e-learning at a US university. The issue of intellectual property rights was rated last in a list of concerns, with only 32 percent considering it to be a major concern.

Managers' survey

From Table 28 it can be seen that the opinions on the satisfactory resolution of intellectual property rights were spread across the range, with a mean score of 3.67 placing it in the very (but not critically) important category.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Satisfactory resolution of intellectual property rights issues	2	10	4	2	0	3.67

Table 28. e-Learning managers' ratings of tutors' perception resolution of intellectual property rights issues as a driver of e-learning.

Case studies

Participants raised no relevant points.

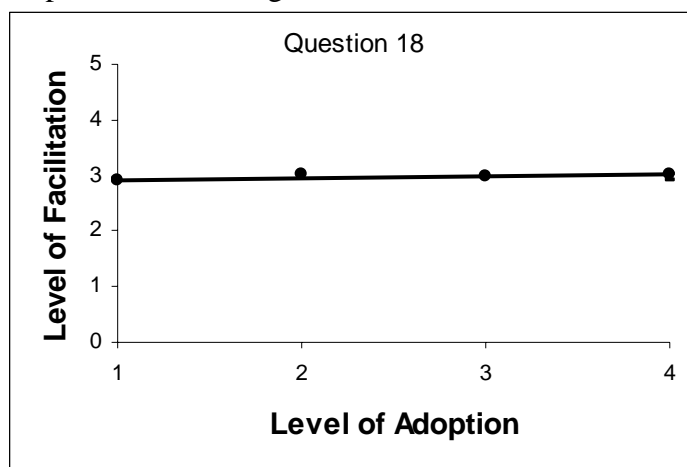
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

Resolution of intellectual property rights constituted the third lowest rated issue, the mean of 2.98 indicating that tutors felt it was neither facilitating nor inhibiting. The very low facilitation factor (0.12) showed that there were negligible differences among the ratings made by tutors according to the four levels of adoption.

Figure 41. Effect of resolution of tutors' intellectual property rights in e-learning on their adoption of e-learning.



Mean for total sample: 2.98

Facilitation factor: 0.12

Conclusions and implications

Tutors who become involved with e-learning will also need to clarify with their institution the issue of intellectual property rights in relation to the e-learning course materials and activities that they develop. Limited knowledge of copyright and intellectual property policies may cause some friction between faculty and management in relation to e-learning resource development. Different institutions will have different policies in regard to this issue, and these may or may not be consistent with contractual employment obligations and union policies (such as the distinction between ownership and moral rights of authorship, and the use of course materials in programmes). Overall, the findings for this variable seem to indicate that intellectual property issues are yet to make a significant impact on the adoption of e-learning in the ITPNZ context, but this does not mean that they will not become increasingly important in the future.

6.12 Variable #17: Provision of recognition and rewards

Literature

In an analysis of 102 articles on factors that motivate faculty to teach at a distance, Parker (2003) found that 98 of them mentioned monetary stipends. A recent national survey conducted in the US by the National Education Association (2000) reported finding that 63

percent of distance learning faculty are compensated for distance learning courses as if they were normal courses.

The research literature reviewed for the current project clearly indicates that, with few exceptions, tertiary education institutions do not tangibly recognise or reward faculty for adopting e-learning and that this, in turn, has a negative impact on faculty willingness to do so.

Several studies identify the lack of tangible rewards. For example, in a survey of faculty who taught online in a US university, McKenzie et al. (2000) found that inadequate compensation and incentives for delivering on-line classes were among the most frequently mentioned barriers. Similarly, Berge & Muilenburg (2000) reported that in their survey of faculty, administrators and support staff in US universities, of 64 potential barriers to distance education, faculty compensation and incentives was ranked ninth. In their survey of faculty with interest and experience in instructional technology, Chizmar & Williams (2001) found that 57 percent strongly or somewhat agreed with the proposition that 'Some tangible rewards and incentives for spending time developing classroom technology would do more to motivate me than more training.' In an opinion piece on faculty resistance to participation in distance education, Bower (2001) draws attention to the concern that faculty have in spending time in developing distance learning courses at the expense of time spent on other professional activities which may be needed to be successful in the tenure process. Bower notes that this issue is particularly important for faculty at research universities who face high expectations in research and publication. [This could be an increasing concern in New Zealand with the shift towards PBRF.].

Similar results to the above have been reported by Bennett (2001), Brooks (2003), Cronje & Murdoch (2001), Deaton & Singleton (2004), Dooley & Murphrey (2000), Giannoni & Tesone (2003), Microsoft Scholars (1997), Robinson (2001), and Wilson (1998, 2001).

Some research suggests, however, that it would be unwise to take a simplistic view of the matter of extrinsic, tangible incentives. As Wolcott & Betts (1999) pointed out in their US study, although there was widespread agreement that compensation for outreach teaching including distance education was not adequate, faculty members were less interested in remuneration than in an acknowledgment of their effort. They go on to point out that distance teaching was of negligible consequence as a scholarly activity in earning a faculty member tenure, merit, or promotion. Time and effort spent preparing instruction, creating materials, and managing distant students had little pay-off other than strengthening a good teaching record and sometimes contributing to the individual's service component. Somewhat equivocal findings were also reported by Betts (1998), who found that over half of the participants in her study stated that definite career advantages would make a difference to their participating in distance education. However, when asked if faculty should get rewarded differently for participation in distance education, over 50 percent stated that faculty should not be rewarded differently for involvement in distance education. Also, according to Hagner & Schneebeck (2001), account should be taken of the different perspectives on rewards that faculty in different groups have. Thus, in the case of those classified as *entrepreneurs*, although they do not seek rewards or recognition for their work, they nevertheless are disappointed when there is an absence of positive feedback. On the other hand, *reward seekers*' motivation is closely tied to the universities' reward structures, and when they see that the adoption of new teaching and learning technologies as having a positive impact on tenure, promotion and salary decisions, they will be more willing to transform.

Of the literature reviewed, only one study had findings suggesting that external incentives were not essential. Miller & Husmann (1999) examined faculty incentives to participate in

distance education. Their findings suggest that faculty primarily have an interest in teaching with technology as a component of student learning, and see internal rewards as the dominant motivation for involvement. Faculty rated most strongly the incentives of internal rewards (mean 4.48) and agreed least with the incentives of external rewards, such as merit pay, reduced teaching load, or credit toward tenure and promotion (mean 3.18). Two other studies produced somewhat mixed results. Pajo & Wallace's (2001) investigation at Massey University showed that just under half (44 percent) of faculty rated a lack of recognition for incorporating e-learning into their teaching as a strong or very strong barrier. In a study by Rockwell et al. (1999), while administrators felt that faculty concerns about teaching via distance related to reward structures, such as recognition through promotion and tenure processes, the faculty did not appear to share this view

Managers' survey

When asked to give their opinions as to the importance of rewards and incentives for tutors in deciding to undertake-learning courses, opinions ranged across the scale, with 8 of the 18 claiming that these were critically or very important, while the remaining 10 considered them to be of only moderate or little importance (see Table 29). With a mean rating of 3.28, this was one of the least important for the 27 factors considered, albeit falling in the moderately important range.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Adequate rewards and incentives for developing e-learning	2	6	5	5	0	3.28

Table 29. e-Learning managers' ratings of tutors' perceptions of rewards and incentives as drivers of e-learning.

Similarly, when asked to give their opinions on the extent to which lack of incentives for developing e-learning courses in their institutions constituted a barrier, the e-learning managers gave this factor as a moderate rating, with a mean of 2.83:

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Lack of incentives for tutors to develop e-learning courses	1	3	7	6	1	2.83

Table XX. e-Learning managers' perception of lack of incentives as a barrier in their institutions.

Case studies

Participants raised no relevant points.

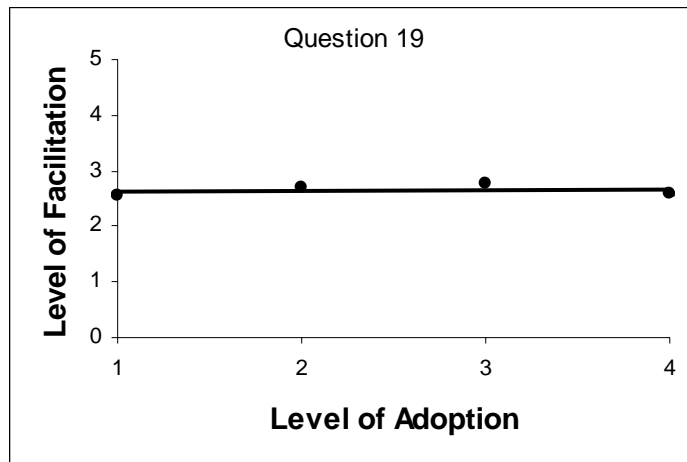
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

Almost identical comments to the intellectual property rights can be made with respect to the effects of providing rewards and incentives (Figure 42). The mean of 2.69 was the lowest of the 30 variables and the facilitation factor of 0.04 was also the lowest recorded.

Figure 42. Effect of provision of adequate rewards and incentives on tutors' adoption of e-learning.



Mean for total sample: 2.69

Facilitation factor: 0.04

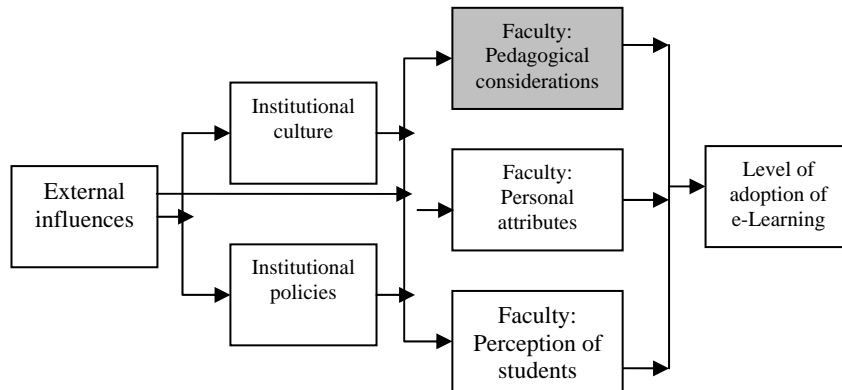
Conclusions and implications

Lack of recognition and rewards is a major factor in discouraging faculty in North American tertiary institutions from adopting e-learning. In almost every study surveyed for this project, faculty demonstrated a reluctance to become involved in e-learning without some form of compensation in time or salary. They argued that developing new courses and learning new techniques could only be achieved at the expense of other essential professional activities like research and consultation with students. However, the managers' and tutors' surveys conducted in this project indicated that rewards and incentives are not yet regarded as important issues in New Zealand ITPs. It seems that the benefits that accrue to institutions and to students from the adoption of e-learning are motivation enough for both management and faculty (see also our comments on variable #27). This should not mean, however, that recognition and rewards can be ignored. As ITPs move towards PBRF and more tutors are involved in contracts and research projects, they may similarly resent the time it takes them to develop new e-learning courses and to learn new methods.

CHAPTER SEVEN

MAJOR FINDINGS

FACULTY: PEDAGOGICAL CONSIDERATIONS



7.1 Introduction

This chapter outlines findings on the relationships between faculty consideration of various pedagogical factors and their decisions to incorporate e-learning into their teaching. These factors include the increased flexibility offered by e-learning, judgements as to its quality and effectiveness, peer support, and confidence in the reliability of technology.

7.2 Variable #18: Increased flexibility

Literature

According to Parker's (2003) analysis of 102 articles on factors that motivate faculty to teach at a distance, flexible scheduling (81 articles) and flexible location (48 articles) were among the most frequently occurring motivations. For example, McKenzie et al. (2000) noted that increased flexibility in working hours and location was the fourth-ranked motivation, being listed by 45 percent of the participants in their study. Closer to home, the two studies that looked into the University of Waikato's mixed media programme (Barr, 2000 and Donaghy & McGee, 2003) both reported that the faculty appreciated the flexibility that teaching online provided, for example by enabling them to teach from home. The former also noted that flexibility was also advantageous to administrators, allowing them to employ part time faculty and to arrange flexible staffing programmes.

Managers' survey

When asked to give their opinions as to the importance of flexibility for tutors in deciding to undertake-learning courses, opinions ranged across the scale, with 12 of the 18 claiming that this was critically or very important, while the remaining 6 considered it to be of only moderate or little importance (see Table 31) The mean rating of 3.73 placed it near the middle of the 27 factors considered.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Institutional support for tutors to work flexible hours etc.	4	8	3	3	0	3.73

Table 31. e-Learning managers' ratings of tutors' perceptions of flexibility as a driver of e-learning.

Case studies

All three institutions were aware of the flexibility that e-learning can provide. The flexibility of e-learning makes it an attractive option for management and tutors who see it as a way of catering more effectively for students in remote areas and students who want to take classes outside normal teaching hours. e-Learning can also provide a range of course materials, interactivities and media.

Increasingly, more and more students will not set foot inside one of our campuses due to the increased stress on various distance delivery options. While e-learning options will dominate, paper-based delivery will continue where sector groups indicate that this is required. (Case Study 1. p.13)

Distance isn't going to be an excuse any more like it once was. (Case Study 2, p.37)

There's a greater percentage of the mature students who want flexibility while they're in full or part-time employment and there is an increasing demand from students who want to work from home, access the network from home and be able to submit all their assignments electronically from home. e-Learning will enable us to maintain our presence in the market for people who are in employment and want flexible access, people who are in our region that currently can't access us. The main thing is to be able to move with the times and to provide flexible access to people within our region. (Case Study 3, p.48)

Analysis of policy documents

The majority of ITPs acknowledged the flexibility of course delivery and study options that e-learning supports. The policies frequently state that the institutions are already providing flexibility in relation to when and how students can study and they refer to e-learning as the means of further breaking down the barriers of distance and time. For example, policies include statements such as:

The Institute already adopts a range of teaching styles and greater flexibility in the way teaching is undertaken and learning occurs is being further enhanced with the advent of e-learning. (Polytechnic X) has a commitment to deliver education and training, where feasible, in a way that facilitates access, recognises difference, and produces quality outcome.

New teaching and learning technologies provide opportunities for the development of flexible modes of delivery. [Polytechnic X] encourages innovation in this area.

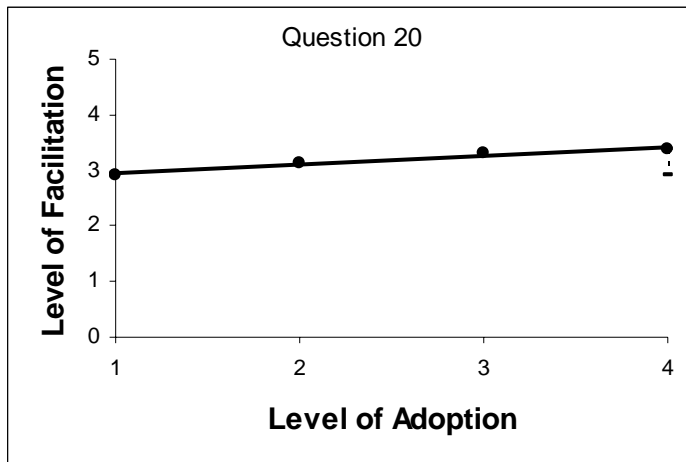
We offer a range of flexible learning options ... We are currently developing programmes for online e-learning in a variety of subjects.

Tutors' survey

With a mean of 3.72, it seems that tutors in general considered that institutional support for tutors to work flexible hours was neither facilitating nor inhibiting, with a trend towards the former. The facilitation factor of 0.49 suggests a low positive relationship between tutors'

levels of e-learning adoption and their ratings of this institutional flexibility variable (see Figure 43).

Figure 43. Effect of institutional support for tutors to work flexible hours, telecommute, etc on tutors' adoption of e-learning.



Mean for total sample: 3.72

Facilitation factor: 0.49

Conclusions and implications

In studies completed in New Zealand and abroad, both faculty and management claim that the flexibility that e-learning can provide is a major motivational factor in its adoption. In these studies, faculty commented on the flexible scheduling that is possible with e-learning and on the way that e-learning can provide the opportunity to teach at various times and in different locations. Management appreciate the way that e-learning can attract new students by allowing them to complete course work at home or their work place and at times that suit them. The e-learning managers surveyed in this project supported these views, the majority choosing flexibility as a 'critically important' or 'very important' motivational factor. Surprisingly, tutors were less positive, considering that flexible hours was neither a facilitating nor an inhibiting factor in their motivation to adopt e-learning. This situation is likely to change as the number of e-learning courses offered in ITPs increase and as tutors become aware of the changing views of what constitutes 'teaching duties.' The question in the tutors' survey referred only to flexibility in terms of hours. e-Learning can also provide flexibility of location and the flexibility that allows tutors to use a greater variety of resources and learning activities to enhance their teaching.

7.3 Variable #19: Recognition of obsolescence of traditional teaching approaches

Literature

e-Learning is not simply an aid to traditional teaching, but, in its most advanced form, is a new approach to teaching. As such, it challenges faculty to re-appraise their teaching philosophies and methods, even to the point of recognising that their approach to teaching may be obsolescent. It is not surprising, therefore that some faculty, and even educational institutions, perceive e-learning as a threat to their cultures. As Hodas (1993), in his seminal paper, proposed, technology is never neutral; its values and practices must always either support or subvert those of the organisation into which it is placed. He further argued that the failures of technology to alter the look-and-feel of institutions results from a mismatch between the values of the institution's organisation and those embedded within the contested technology. In this article Hodas described the introduction of technology into schools but the

conclusions he draws are equally applicable in tertiary institutions. Schools are systems for preserving and transmitting information and authority, for inculcating certain values and practices while minimising or eliminating others. Technologists find to their dismay that teachers can often be persuaded to use the new tools only slightly, if at all. They find further that, even when the tools are used, classroom practice and the look-and-feel of schools remains fundamentally unchanged. This is, Hodas argued, because organisations are not rational actors: their goal is not to solve a defined problem but to relieve the stress on the organisation caused by pressure operating outside of, or overwhelming, the capacity of normal channels. What appears to outsiders as a straightforward improvement can, to an organisation, be felt as undesirably disruptive if it means that the culture must change its values and habits in order to implement it. Technology refusal represents an immediate assessment of the challenges to existing structures and authority that are embodied or embedded in the contested technology. The depth of the resistance is generally, and in broad strokes, proportionate to the seriousness of the actual threat.

Other writers have expressed similar views to Hodas. For example, Scrimshaw (2004) argued that since the majority of teachers tend to prefer to use a variation of a 'teacher-centred' model, it means that for them to make full use of ICT in their work it is necessary for them to make radical changes to the way they teach. According to Jaffee (1998), the recognition of the classroom as a sacred institution in higher education, and a major source of professorial identity, is a necessary first step toward developing strategies for organisational change and pedagogical transformation. In academia, obstacles to change are closely associated with the established practices and cultural traditions of the teaching faculty. One can neither understand the obstacles to organisational change nor develop strategies for implementing change without a consideration and analysis of faculty practices and academic culture. Jaffee believes that for many faculty, teaching without a classroom is not viewed as an "attractive" alternative and it may be viewed as too heavy a cost, regardless of other positive benefits. For many faculty e-learning represents a radical departure from prevailing practice that is incongruous with their understanding of the essential nature of teaching and learning. He concludes by stating that, as human organisations, institutions of higher education are constrained by habit, tradition, and culture. In a review of the literature on barriers to distance education, Hillesheim (1998) noted that most faculty only have experience in a presentation style of teaching, which is inappropriate for an online environment and that they are sometimes unable to adjust from the traditional, teacher-led content-oriented model grounded in presenting information to a lecture-free focus on the process of learning.

Managers' survey

The e-learning managers' opinions as to the importance of tutors feeling comfortable with having less direct control over their teaching as a factor in their deciding to undertake e-learning courses, opinions ranged across the scale, with just over half of the 18 claiming that this was critically or very important, while just under half considered it to be of only moderate or little importance (see Table 31) The mean rating of 3.50 placed it near the middle of the 27 factors considered.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' feeling comfortable with less direct control over teaching	2	8	5	3	0	3.50

Table 31. e-Learning managers' ratings of tutors' comfort with less direct control over their teaching as a driver of e-learning.

Case studies

Management and most faculty agree that change to e-learning would involve a significant change in pedagogy, but the view that traditional methods of teaching and learning were becoming obsolete as new technology-rich ways of teaching are introduced was not universally held. Even those who saw change as inevitable described new pedagogies vaguely, and it is certainly not clear that everyone who advocates pedagogical change fully understood the implications of this. Commitment to more traditional face-to-face methods and views on the perceived benefits of these methods were firmly held in some quarters. Those who held these views argued that decisions on how, what and when e-learning should be introduced should be based firmly on the demonstrated benefits this introduction would have in improving teaching and learning.

Communication with the students on-line is certainly different from that in a classroom situation but that need not be a problem. (Case Study 1, p.26)

Tutors may have to change their teaching style. They've certainly got to adapt, but you learn that by being a student first and actually doing the interaction as a class before you realise what it takes to be a tutor in that environment. (Case Study 1, p.26)

I think that in e-learning, if we are actually looking at a new paradigm of teaching and learning education that's going to kick in over the next ten or fifteen years. It's not just going to be in the tertiary sector, it's going to be right the way through, and we have to be looking now at what happens in the tertiary sector in terms of what's happening in the rest of the education sector. (Case Study 3, p.57)

Analysis of policy documents

There was no suggestion in the publicly available policies of the 20 ITP's that traditional teaching methods are considered to be obsolete. However, there is recognition that change is afoot as some of the policies referred to new technologies and innovative teaching methods and strategies. While the potential of e-learning was recognised, many referred to e-learning as a way of providing flexible access options for students from their own communities. Several of the policies referred to the opportunity e-learning provides for reaching students who may wish to study a specialty subject in which the ITP has particular expertise. Examples from the policies include:

(Polytechnic X) recognises the diversity of student learning needs and therefore offers a variety of educational delivery modes to suit those students both on and off campus.

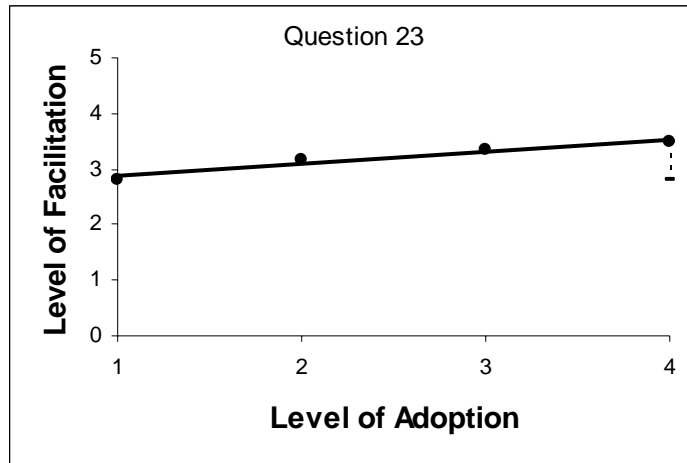
(Polytechnic X) gives particular attention to the needs of mid-career professionals who require flexible delivery options that will enable them to balance work and study.

Tutors' survey

As shown in Figure 44, with a mean of 3.26, it seems that tutors in general were only moderately concerned that e-learning would give them less direct control over their teaching,

although there was a slight trend towards seeing it as having an inhibiting effect. The facilitation factor of 0.66 indicates a moderately positive relationship between tutors' levels of e-learning adoption and their concern about the possibility of reduced control over their teaching.

Figure 44. Effect of tutors' comfort with the idea that e-learning will give them less direct control over their teaching on their adoption of e-learning.



Mean for total sample: 3.26
Facilitation factor: 0.66

Conclusions and implications

As the literature review notes, challenges made by technology to a predominant culture of teaching in an organization may be viewed as disruptive to the current values and practices (Hodas 1993, Scrimshaw 2004). If a teacher-led content-oriented model is dominant, then for teaching staff to engage in e-learning is a major shift in pedagogical approach to a more process-oriented and student-centred methodology.

The e-learning manager's survey on this item was evenly balanced, with about half rating it as critically or very important, and half considering it to be of moderate or little importance. The Case Study findings indicate that although there was some agreement that e-learning would involve a significant change in pedagogy, there was not a clear understanding of what that new pedagogy might be. Some Case Study participants also argued strongly for the benefits of more traditional face-to-face methods – participants did not universally agree to the obsolescence of traditional approaches.

The tutors' survey suggested a high positive relationship between tutors' levels of e-learning adoption and their ratings of its pedagogical benefits. In other words, Embracers were much more likely to perceive the pedagogical benefits than Doubters/Refusers (Fig. 34). In another section of the tutor survey, an understanding that e-learning can be combined with some traditional teaching methods was seen as a facilitating factor by most respondents, and this view was held across the board by both Doubters/Refusers and Embracers (Fig. 51).

As Kassop (2003) points out, for those willing to embrace innovation in the online environment, the online teaching/learning medium has the potential to change the teaching and learning culture of the organization. He goes on to list 10 areas in which he believes online education matches or surpasses face-to-face learning. For most ITPs, the most likely scenario for e-learning development initially is blended learning - a mixture of face-to-face and e-learning activities. This type of innovation will enable and encourage recognition of

the new types of teaching/learning strategies that can be implemented in an e-learning environment to complement existing effective face-to-face teaching and learning strategies.

The findings for this item suggest that an institutional focus on innovation and adding to the tutor's range of teaching/learning options will be viewed more positively than an 'out with the old, in with new' approach in relation to e-learning, and that institutions must not neglect the professional development of tutors in relation to pedagogical theories and practices needed for good e-learning facilitation.

7.4 Variable #20: Appropriateness for subject area

Literature

Is e-learning appropriate for all subject areas? In her study of faculty and deans in a US university, Betts (1998) asked what their university's policy on distance education should be. Of the five prevalent policy recommendations that emerged one was the option to participate or not to participate in distance education, on the grounds that some disciplines lend themselves better to distance education than others. Similarly, while all participants in a professional development course on online learning carried out by Colaric, Taymans & Booz, 2004 considered distance education to be an effective way for students to learn, there was a decrease in agreement when faculty members' particular areas of study were mentioned. Conversely, there is some evidence that particular subjects might favour e-learning approaches. Thus Hyland (2003), in her study of academic staff from the Department of Theology and Religious Studies at the University of Otago, noted that since classes in this subject were relatively small, participants were already experienced in encouraging student participation using teaching strategies that went beyond the transmission of information that characterises mass lectures. Most thought of themselves as facilitators of student learning consistent with a constructivist approach to education in an online teaching environment.

The evidence that e-learning is perceived to be dependent on the nature of the discipline area is by no means overwhelming, several studies showing that that factor is accorded low priority. For example, in their study of faculty in Scottish Higher Education Institutions, Haywood et al (2000) found that only 25 percent of the participants listed course characteristics as a reason for them not using learning technology in their teaching. Similarly, in their Massey University study, Pajo & Wallace (2001) found that only 20.2 percent of respondents rated their material as being not suited to e-learning as constituting a strong or very strong barrier. Likewise, the participants in Redman & Kotrlik's (2004) study rated the type of courses they taught as constituting only a minor barrier or no barrier at all (mean 1.61 on a 5-point Likert scale).

Thus, while the nature of a faculty member's subject area may not be a powerful determinant overall of their adoption of e-learning, it is one that has to be taken into account, at least among a significant minority of faculty.

Managers' survey

As shown in Table 32, the e-learning managers considered that tutors' perceptions of the relevance of e-learning to their subject was of considerable importance in their decision to adopt this approach, this variable having a mean rating of 4.22, one of the highest.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/ no importance</i>	<i>Mean</i>
Tutors' perception of relevance of e-learning to their subject area(s)	6	10	2	0	0	4.22

Table 32. e-Learning managers' ratings of tutors' perceptions of relevance to their subject areas as a driver of e-learning.

Case studies

Management in the three institutions saw few problems in introducing e-learning, agreeing that it can be applied to almost all subjects. There was a greater variation of opinion among tutors. Those interviewed for Case Study Two envisaged no problems in adopting e-learning and saw it as appropriate for the subjects they teach. Most of the tutors interviewed for Case Study One were convinced that e-learning could be applied to most subjects if it is used in conjunction with other methods and if it is appropriate for their classes. Tutors in Case Study Three were aware that the availability of resources from the web could enrich the teaching of theoretical aspects of their course, but most expressed the view that practical aspects of the courses cannot be successfully taught through e-learning.

The experts say that any subject can be taught on-line but I disagree with that, because there are some that lend themselves better than others. (Case Study 1. p.19)

Maybe e-learning is not relevant to horticulture, for example, whereas it might be relevant to IT, media arts, or communication. (Case Study 1. p.19)

There is likely to be some resistance [from tutors] due to the fear of new technology. This is particularly true in a polytechnic where a lot of programmes and courses are practically based and where many tutors come from a field of employment where even chalk and talk can be a different experience, let alone this digital stuff. (Case Study 1, p.14)

There's an element of, if it ain't broke. I still believe if it ain't broke, don't fix it. (Case Study 1, p.19)

Our programmes actually state in their aim that they are experientially-based, I see a polytech as being vocationally based with a pretty high, "get your hands around it" component. (Case Study 1. p.19).

Our programmes are very practical. There may be some elements [of e-learning] that could be used, but [our courses are] probably 70 to 80 percent practical. (Case Study 3, p.52)

I think you'll find the practical, hands-on sorts of subjects are more difficult to do through e-learning. (Case Study 3, p.52)

Analysis of policy documents

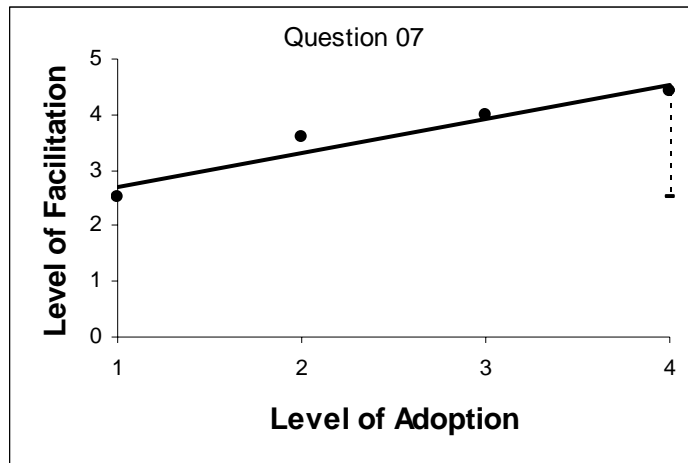
The majority of ITPs refer to e-learning as a delivery mode and while there is no reference to it being more appropriate for specific subject areas, several of the ITPs do mention subject areas which are available via e-learning.

Tutors' survey

As portrayed in Figure 45, with a mean of 3.77, it seems that tutors in general considered that the relevance of e-learning to their subject areas to be rather more facilitating than inhibiting. However the facilitation factor of 1.87, by far the highest recorded for the 30 variables, suggests a strong positive relationship between tutors' levels of e-learning adoption and their

views of its appropriateness to their subject areas. In other words, there is a strong indication that those who have not committed themselves to e-learning (i.e., Doubters and Refusers) are seeing it as not being appropriate to their subjects, whereas Embracers have no such qualms.

Figure 45. Effect of relevance of e-learning to tutors' subject areas on their adoption of e-learning.



Mean for total sample: 3.77

Facilitation factor: 1.87

Conclusions and implications

The courses offered in ITPs vary enormously in character and complexity. For this reason it is difficult to make any kind of generalisation about the appropriateness of e-learning that will apply to all courses and to all tutors. While e-learning may be readily applied in some courses, its application is less obvious in others. A large proportion of the courses offered at polytechnics are of a practical nature and tutors make a strong case for students to be able to demonstrate practical proficiency in these courses. As one manager commented, 'Resistance is likely in an institution in which a lot of programmes and courses are practically based and where many tutors come from a field where even chalk and talk can be a different experience' (Case Studies Report, p.15).

The e-learning managers' survey indicated that they regarded the perceived unsuitability of e-learning for teaching and testing practical subjects as a major inhibiting factor. In the e-learning managers' survey carried out as part of this study, almost all managers rated tutors' perception of the relevance of e-learning to their subject area as a 'very important' or 'most important' factor in determining whether or not tutors readily adopted e-learning.

Results from the tutors' survey show a marked difference in levels of adoption. Tutors currently using e-learning tools perceive these tools as relevant for their discipline. A smaller, but significant, number remain unconvinced. While everyone surveyed agreed that some courses would always be harder to teach on-line than others, a majority of tutors were prepared to accept that e-learning could be applied in their courses, particularly if a number of provisos were met. Tutors in this study argued, like faculty in studies by researchers like Betts (1998) and Donaghy & McGee (2003), that totally replacing face-to-face teaching with e-learning is beneficial to neither students nor faculty. Tutors in this study, as in others (see for example Colaric et al. 2004), preferred to combine e-learning with aspects of traditional teaching and learning.

While some tutors might be reluctant, at least initially, to teach all of their courses using e-learning, they are prepared to use aspects of e-learning if it can be demonstrated that this will improve or facilitate their teaching. Hyland (2003) argues that teachers seek satisfaction and

enjoyment in their job. Teaching meets these criteria if participants are happy with what and how they are teaching and if the experience is relatively stress-free. Tutors are prepared to move away from existing approaches if they believe they can achieve similar success with e-learning fairly easily.

7.5 Variable: 21: Assurance of quality outcomes and Variable #24: Belief that e-learning is at least as effective as traditional teaching

Literature

The issue of the quality of e-learning is one that concerns many faculty. Does it have the potential to yield superior results to traditional teaching approaches or, at the very least, is it just as likely to produce comparable quality courses with advantages lying elsewhere? In their content analysis of 32 published in-depth case studies of leading organisations to identify the barriers to using distance education Cho & Berge (2002) found that 15 focused on concern over a lack of research supporting the effectiveness of distance learning, as well as a lack of effective evaluation methods for distance learning courses and programmes. Simmons (2002) cites a study of 144 US companies as evidence to indicate that, while an increasing number are anxious to take advantage of e-learning's benefits and promises, most have found that there are significant barriers to adoption. Of relevance to the theme of quality, these barriers included cost versus value (2nd), difficulty in measuring results (3rd), and the quality of learning content.

Further insights into the issue of quality were provided by a large-scale study conducted by Allen & Seaman (2003), who surveyed all 3,033 degree-granting institutions of higher learning in the USA, with responses being received from 944. They found that, compared to face-to-face teaching, learning outcomes in online education were given mixed ratings by academic leaders. It was rated as superior by 17.4 percent of the respondents, the same by 57.6 percent, and inferior by 24.9 percent. (Significantly, though, nearly one-fifth thought that in three years' time the quality of online learning, compared with face-to-face teaching, would improve from inferior to superior.) In a related finding, Allen & Seaman reported that the academic leaders rated faculty acceptance of the value and legitimacy of online education as follows: strongly agree/agree: 59.6 percent, neutral: 21.3 percent, strongly disagree/disagree: 18.7 percent. A second US study also showed some concern about the quality of online teaching *vis a vis* more traditional approaches. Betts (1998) premised her study with the observation that, despite the recent expansion of distance education programmes across the US, research indicates that many faculty resist participation in distance education. In her study of faculty and deans in a US university, Betts found that concern about the quality of courses was among the top five inhibiting factors.

Several other studies have reported faculty concerns about the quality of e-learning courses. Firstly, in a study of factors that motivate or inhibit faculty to participate in asynchronous learning networks (ALNs), Schifter (2000) found that the top five inhibiting factors for both participators and non-participators in ALNs included a concern about the quality of courses. Secondly, in a study to investigate distance learning in Kentucky's higher education system, Wilson (2001) found that while faculty had a positive attitude toward distance education as a general concept, they were less enthusiastic about personal involvement and were unsure of its instructional efficacy. Thirdly, in their study of factors that deter faculty from participation in distance education, O'Quinn, & Corry (2002) analysed the degree to which a set of 30 factors may have inhibited faculty's participation in distance education. Of the faculty who taught a combination of distance and classroom courses, concern about the quality of distance education was rated 12th, with a mean of 2.94 on a Likert rating scale.

Somewhat contrary results to the foregoing were reported by Fredericksen et al. (2000), in their survey of 105 instructors' views of factors that significantly contributed to their satisfaction with on-line teaching. When asked to rate their students' performance in the on-line classroom relative to the traditional classroom, approximately 45 percent felt that their on-line students performed better than their classroom students did, about 44 percent felt there was no difference in the performance and only 8.6 percent felt that their classroom students performed better.

Managers' survey

Three questions bear on the issue of the impact of faculty perceptions of the quality of e-learning on their decisions to adopt it in their teaching. Firstly, Table 33 shows that e-learning managers considered that tutors' convictions as to its pedagogical benefits was of considerable importance, with a mean rating of 4.06.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' conviction as to pedagogical benefits of e-learning	6	8	3	1	0	4.06

Table 33. e-Learning managers' ratings of tutors' perceptions of pedagogical benefits as a driver of e-learning.

Secondly, when asked to give their opinions as to the extent to which tutors' lack of knowledge of e-learning might constitute a barrier, the managers gave this factor only a moderate rating of 3.39 (see Table 34). Similarly, a moderate rating (mean 3.17) was accorded to the extent to which tutors' perceptions that e-learning offers no significant advantages over face-to-face teaching constituted a barrier (see Table 35).

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Tutors' lack of knowledge of e-learning	0	3	7	6	2	3.39

Table 34. e-Learning managers perception of tutors' lack of knowledge of e-learning as a barrier in their institutions

Factor	<i>Not a barrier</i>	<i>Minor barrier</i>	<i>Moderate barrier</i>	<i>Significant barrier</i>	<i>Major barrier</i>	<i>Mean</i>
Tutors' view that e-learning does not offer significant pedagogical advantages over face-to-face teaching	1	4	6	5	2	3.17

Table 35. e-Learning managers' perceptions that tutors consider e-learning does not offer advantages as a barrier in their institutions.

Case studies

Quality assurance is a major issue in all three institutions. Concerns about the quality of courses were more often raised by tutors than by management. Tutors wanted to be assured that introducing e-learning would not detract from the quality of their courses. They were adamant that e-learning should not be based on sequential presentation of course material and superficial assessment.

Quality is an issue, isn't it? You can teach anything, but how well can you teach it with a depth of understanding? (Case Study 1, p.26)

We've hung our hat on our programmes being quality. - - -It's not just good enough to have e-learning. It's going to have to be at least at the quality that we already have or the whole place will perceive us to have stepped backwards. (Case Study 1, p.26)

A lot of time when we talk about e-learning or e-whatever, we put a lot of emphasis on the system and the software and the computer and all that. In fact, they're worth nothing compared to the e-tutor. That's where the focus should be. (Case Study 1, p.26)

Most of the faculty interviewed in Case Studies One and Two agreed that e-learning was at least as effective as the methods currently in use. Tutors in Case Study Three argued that while e-learning can be beneficial for content-rich courses where recall of knowledge is the only assessment requirement, it cannot provide the perceived deep learning experience and understanding that face-to-face teaching provides.

It's [e-learning] been an extra dimension for us. I mean, I can only think of the advantages; I can't think of any disadvantages for us. (Case Study 2, p.38)

Teaching is interacting with people and I much prefer that to a bloody computer. (Case Study 1, p.16)

In a classroom you can moderate your teaching style and quickly alter your material to respond to what is an obvious visual trigger from a class. You can't do that on-line. (Case Study 1, p.17)

You are surrounded by people that are very enthusiastic and committed, I'm a lot more cautious than that, although I'm committed to exploring it, I'm very cautious about its actual benefit. (Case Study 3, p.51)

When the term first appeared, it was touted as if it was going to be some sort of a breakthrough, but when you've been in education for a while you realise that there are no major breakthroughs. I don't think there have ever been any major breakthroughs. (Case Study 3, p.51)

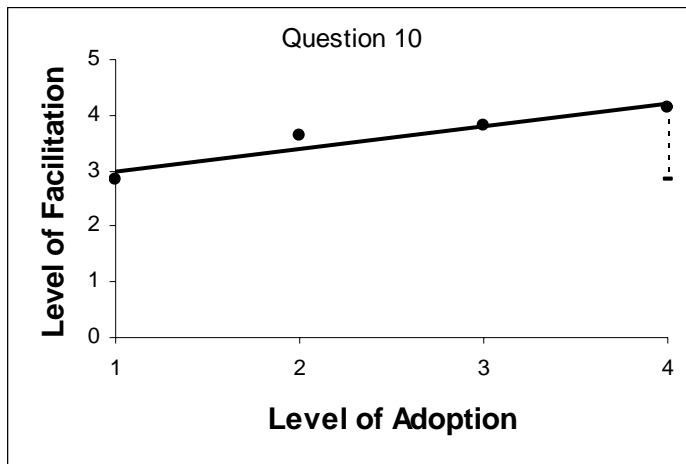
Analysis of policy documents

Not addressed in policy documents.

Tutors' survey

With a mean of 3.70, it seems that tutors in general considered their opinions as to the pedagogical benefits of e-learning was rather more facilitating than inhibiting (see Figure 46). The facilitation factor of 1.27, the second highest recorded for the 30 variables, suggests a positive relationship between tutors' levels of e-learning adoption and their ratings of its pedagogical benefits. In other words, Embracers were much more likely to perceive benefits than Doubters/Refusers.

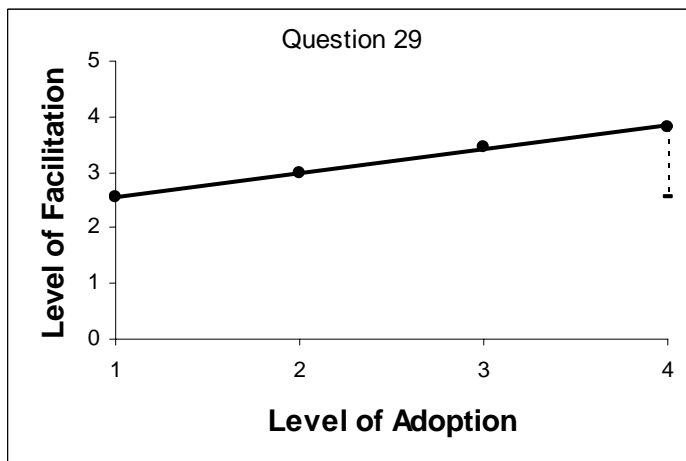
Figure 46. Effect of tutors' opinions as to the pedagogical benefits of e-learning on their adoption of e-learning.



Mean for total sample: 3.70
Facilitation factor: 1.27

In Figure 47, the mean of 3.25 suggests that, in general, tutors' knowledge of research into the effectiveness of e-learning was neither facilitating nor inhibiting. However, the facilitation factor of 1.26 (ranked second equal) indicated substantial differences in the opinions of Doubters/Refusers, on the one hand, and Embracers on the other. The former were much more inclined to see this as an inhibitory factor, while the latter viewed it as a facilitating factor. Of course, it is possible that the Doubters/Refusers know the literature but don't like what they read!

Figure 47. Effect of tutors' knowledge of research into the effectiveness of e-learning on their adoption of e-learning.



Mean for total sample: 3.25
Facilitation factor: 1.26

Conclusions and implications

Anecdotal evidence from enthusiasts and early adopters of e-learning (for example, Kassop, 2003) put the case for the quality and effectiveness of e-learning as being at least equal to, or in cases surpassing the face-to-face classroom. However, this view is not universal among faculty. There needs to be some intervention in the organisation to facilitate change in tutor beliefs about teaching and learning. This can be accomplished through a range of organisational and professional development initiatives, for example, staff mentoring with

other experienced e-learning staff, public sharing of 'best practice' e-learning exemplars, and staff development where tutors have positive e-learning models and experience.

Robust quality assurance processes which evaluate all aspects of e-learning are now becoming more widespread, and a number of rubric and survey tools are being used to assist with this process (Roblyer & Ekham, 2000; Kane, 2004). Use of these types of evaluative tools as well as qualitative feedback from tutors and students will be essential for progress in quality assurance and to build tutor confidence in e-learning as an effective teaching modality.

7.6 Variable #22: Enhancement of teaching and learning

Literature

A theme related to the previous one of quality is tutors' beliefs regarding the extent to which e-learning enhances teaching and learning. Three empirical investigations bear on this issue. Firstly, in their study of a US university, Daugherty & Funke (1998) found that faculty identified convenience, increased access to the most current and global content information available, and improved learning as advantages for students enrolled in Web-based instruction. Secondly, Dooley & Murphrey (2000) present the results of a study of how the perspectives of administrators, faculty, and support units in a US university impact on the rate of distance education adoption. They found that all groups identified the enhancement of teaching and learning as the most significant strength. In the third study, Fredericksen et al. (2000) described an online instructional programme created for the 64 colleges of the State University of New York and examined factors that have contributed to the high level of faculty satisfaction with the programme. Of particular relevance to the present theme were the faculty's reasons for choosing to teach an online course. The most common responses were "an interest in on-line teaching and learning" and an "interest in technology and the internet" which accounted for nearly 70 percent of responses. Less than 2 percent of respondents felt that they wanted to or needed to telecommute and less than 3 percent chose to teach due to fear of being left behind. Respondents to the survey were also asked how they felt about the effects of the technology used in teaching an online course. When asked to what extent they agreed with the statement, "Overall, I think the technology had a positive effect on my teaching", approximately 42 percent agreed strongly and another 50 percent stating that they agreed.

Two opinion pieces emphasise that e-learning should enhance teaching and learning. Firstly, De Boer and Collis (2002) argue that it is critical that a pedagogic motivation steers instructors' decisions. They believe that for effective e-learning to take place, pedagogical decisions have to be made by the instructor. In their institution, the authors developed a pedagogical approach in which a balance was struck between two different models: one that focuses on the acquisition of pre-determined knowledge and the development of pre-specified concept, and a second model that involves becoming a member of a learning community and also contributing to it. Secondly, Errington (2001) notes that it has long been recognised that teacher beliefs have a significant impact on the relative success of innovation in traditional settings. Personal beliefs fulfil two functions, the need to know and understand and the need to ward off threatening aspects of reality. It is the interaction between these two that can make or break flexible learning initiatives. Errington further argues that protagonists of flexible learning are seen to value a learning management approach as opposed to an 'academic as expert' approach. This involves greater equity in teacher-student power relationships, diversity of student population, equity of learning access, independent learning, negotiated learning tasks, variety of learning media delivery and opportunities for reflective learning. A technology skills approach to innovation is likely to fail if it does not take into account teachers' concepts of teaching and learning. Given teachers' often-firm views about teaching

and learning, there is a tendency for them to reproduce the same kinds of pedagogical approaches regardless of the media employed. For this reason, professional development is most likely to succeed when the teacher's own beliefs about teaching and learning are the starting point. The overall challenge is to help teachers identify and critically examine beliefs about teaching and learning and use these as informed contexts in which to site prospective innovations such as e-learning

Managers' survey

See variable #6.

Case studies

Faculty interviewed in all three case studies saw e-learning as having the potential to enhance both course content and teaching methodology. Tutors in Case Study Two were especially enthusiastic. Tutors in Case Studies One and Three, while acknowledging the e benefits of e-learning, expressed concern about a possible reduction in face-to-face contact with students. Some argued that this had the potential to reduce the quality of the courses they offered.

I think it's a way of enhancing your teaching, rather than just more of the same. It's another dimension ... we all know they learn in different ways ... and this is just another avenue for them to learn from. (Case Study 2, p.38)

When the term first appeared, it was touted as if it was going to be some sort of a breakthrough, but when you've been in education for a while you realise that there are no major breakthroughs. I don't think there have ever been any major breakthroughs. (Case Study 3, p.51).

When the tape recorder first came in, that was supposed to revolutionise language teaching, and OHTs, and I remember when epidiascopes came in, and video. We are doing it again. We think it's got to be e-learning or we've missed the boat. Why can't we incorporate all these things in ways that work best for us, both for teachers and for students? (Case Study 1. p.19).

Analysis of policy documents

This was addressed by only one ITP policy which stated that the institution would 'Ensure that flexibility of delivery is driven by sound pedagogy and not simply technology'.

Tutors' survey

See variables #5 and 6.

Conclusions and implications

The potential of e-learning to enhance the teaching and learning process is supported to some degree – at least in faculty perceptions - by the findings in this study. This potential will only be met where faculty doubts can be satisfactorily answered and shifts made in the teaching approaches that tutors employ. Faculty views may be changed through a range of organisational and professional development initiatives, for example, staff mentoring with other experienced e-learning staff, and public sharing of 'best practice' e-learning exemplars. Another factor which can help influence and change staff beliefs about the possibility of e-learning to enhance teaching and learning is staff development where tutors have a positive e-learning experience as a student on an e-learning course, where good e-mentoring practice is modelled by the course facilitator.

7.7 Variables #23: Support from, and modelling by, peers and Variable #29: Opportunity to work in teams

Literature

Much of what we learn is learned from our peers, particularly those whose skills or personalities we admire. This is no less true for faculty adoption of e-learning. For example, Bennett (2001) reported on the results of a study of lecturers in a UK concerning their utilisation of and attitudes towards new teaching methods, including information technology. Respondents reported that, in the main, they obtained their information informally, with peer influences exerting significant effects, and that the information so gathered was regarded as more credible and trustworthy than that available from “official” sources. Bennett felt that the crucial importance of peer pressure as an inducement to lecturers to adopt new methods indicates the desirability of management identifying within its teaching staff a handful of highly influential individuals whose support may be enlisted to champion the cause of new teaching methods. University managements need to realise that people who are known, liked and trusted as teaching peers are far more likely to be believed and emulated than any number of “official” role models. In a similar vein, Wilson & Stacey (2004) recommended that institutions approach staff development from the perspective of designing support that is aligned to the levels of need and/or readiness levels of the academic staff. Thus, faculty at the introductory level need 'Show and Tell' activities, operational training, short seminars on current activities within the institution, guest speakers, and exemplars. In contrast, faculty at an advanced level become role models for others, act as resource for other staff, providing advice, and can be used as formal and informal participants in a staff development programme. Wilson & Stacey further argued that a focus on local and discipline-based ideas and practices, peer support and mentoring approaches can provide a relevant approach. If projects and project teams within schools or departments are the context for staff development, they provide authentic purpose and deploy support staff in context for a more effective result. As staff practise the newly learned skills as they are needed, and seek expert or experienced pedagogical advice as it is required, staff development will be relevant and implemented.

Several other writers focus on the role peers play in influencing faculty to adopt e-learning. Firstly, in a survey of faculty attitudes towards instructional technology, Chizmar & Williams (2001) found that 61 percent felt that the demonstration of success and failures of other faculty technology projects would be helpful, while 63 percent would like more faculty showcases of instructional technology that demonstrate real-world applications in the classroom. Secondly, in a Massey University study, Pajo & Wallace (2001) found that 33 percent of their respondents rated a lack of role models as a strong or very strong barrier to adopting e-learning. Thirdly, in a review of the literature, Deaton & Singleton (2004) reported on motivating and demotivating factors in university faculty members' perceptions of internet-based learning, noting that incentives included support from other faculty and opportunities to work in teams. And finally, writing from an Australian perspective, Kirkpatrick (2001) pointed out that while flexible learning has been embraced by higher education for a number of reasons, its adoption, particularly when it incorporates information technologies, has been problematic. He noted that experiences in Australian tertiary institutions have resulted in some consistent recommendations about the nature of support necessary to encourage university staff to consider flexible learning. These include working models and examples of practice.

Managers' survey

As shown in Table 36, the e-learning managers gave a very high rating to the availability of mentors as influencing tutors' decisions to adopt e-learning. All 18 rated this factor as being critically or very important (mean 4.39).

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Availability of mentors (especially other tutors experienced in e-learning)	7	11	0	0	0	4.39

Table 36. e-Learning managers' ratings of tutors' perceptions of availability of mentors as a driver of e-learning.

Case studies

The availability of peer support, guidance and advice, both from internal and external colleagues, was considered to be essential in all three institutions. Tutors were of the opinion that this sharing of experiences could provide them with models and examples, avoiding the trials and tribulations that occur when tutors introduce e-learning activities within their courses on their own.

The potential of working with teams to develop e-learning and the potential benefits derived from a collaborative team environment had not been fully articulated or explored in any of the institutions in the study. However, faculty in all three institutions were used to working with colleagues on departmental programmes and projects. While none of the institutions had yet developed clear policies of professional development and support, it seemed likely that this would be delivered through teams.

Faculties have a strong role in this as do the deans and the academic leaders, because they're in charge of the teaching research delivery (Case Study 1, p.14).

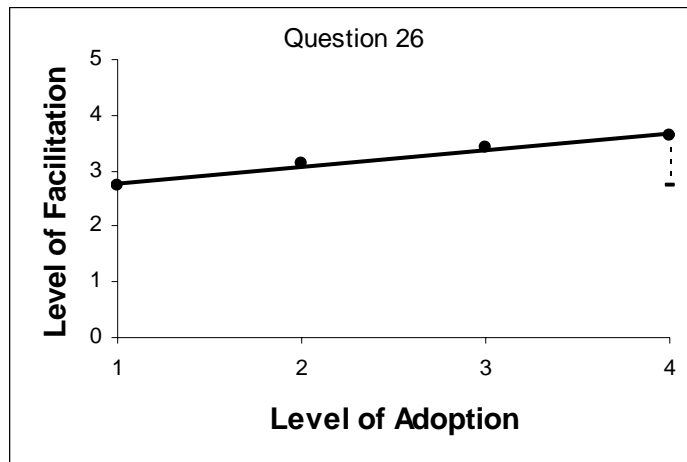
Analysis of policy documents

The policies do not directly refer to opportunities to work in teams. However, the ITPs who are in collaborative alliances (e.g., TANZ, e-Learnz, TEA and others alliances) are working in teams to develop programmes for e-learning across the ITPs within the given alliance. Other initiatives within alliances include sharing expert resources, advice and staff development in e-learning, and facilitating research in the field of e-learning.

Tutors' survey

With a mean of 3.28, it seems that tutors in general considered the availability of mentors to be neither facilitating nor inhibiting. The facilitation factor of 0.99 suggests a moderately positive relationship between tutors' levels of e-learning adoption and their ratings of availability of mentors. In other words, mentors could well have played a significant role in facilitating Embracers adoption of e-learning and (possibly) their absence might have inhibited Doubters/Refusers.

Figure 48. Effect of availability of mentors (especially other tutors experienced in e-learning) to guide tutors on their adoption of e-learning.



Mean for total sample: 3.28

Facilitation factor: 0.99

Conclusions and implications

These findings and the literature review confirm the importance of developing a strategy for a peer-based approach to e-learning staff support, with staff appointed to work alongside and provide peer support to others engaged in adopting new technologies in teaching and learning. Examples of this approach from Australia are the Learning Technology Mentor Programme introduced at the Royal Melbourne Institute of Technology (McNaught, 2003), and the Deakin Online Teaching Fellows at Deakin University (Wilson & Stacey, 2004). This and a team teaching approach to e-learning enables new tutors to build on good practices of peers including more experienced tutors.

7.8 Variable #25: Confidence in access to reliable technology

Literature

It is almost self-evident that before embarking on e-learning, faculty would want to be confident that the technology that underpins it was reliable. This point comes through quite strongly in several studies. For example, Brown & Czerniewicz (2004) surveyed faculty members in five higher education institutions in South Africa to ascertain their access to information and communications technology and how they used it for teaching and learning. Access to physical resources emerged as the most dominant issue in terms of hindering or encouraging the use of computers in teaching. Computer-related issues were cited in 43 percent of the comments, followed by purpose (30 percent), personal ability (28 percent), infrastructure (23 percent), and support (19 percent). Computer hardware dominated the computer-related issues (49 percent), while the internet and networks were predominantly mentioned when referring to infrastructure (53 percent and 41 percent, respectively). These figures refer to both hindering and encouraging factors identified by the respondents. For example, faculty had both negative and positive comments to make about access at work and home (work 38 percent positive, 47 percent negative; home 41 percent positive, 58 percent negative). When referring to experiences using computers for teaching, the comments were more negatively skewed: 16 percent positive and 58 percent negative. Results in a similar vein were reported by Butler & Sellborn (2002) in their investigation of barriers to adopting technology for teaching and learning as perceived by faculty members in a college of sciences and humanities in an American university. The highest-ranking factor was reliability of the

technology (mean of 3.64 out of 4), with difficulty in using technology ranking fourth (mean 3.15). Similarly, in Daugherty & Funke's (1998) study of a US university, faculty reported a wide range of challenges in the development and delivery of Web-based instruction. A lack of software/adequate equipment ranked among the five most frequently identified barriers.

Several other writers note access to reliable technology as an issue in determining the adoption of e-learning. Donaghy & McGee (2003) reported that some lecturers participating in the University of Waikato's mixed media programme felt that continual changes in computer technology was sometimes a matter of concern. Dooley & Murphrey (2000) present the results of a study of how the perspectives of administrators, faculty, and support units in a US university impact the rate of distance education adoption. The prominent weaknesses included technological glitches. In their study of staff in Scottish higher education institutions, Haywood et al. (2000) reported that in spite of the broadly positive views of the value of the learning technology, many serious barriers exist which inhibit the widespread use of e-learning. These included a lack of reliable and adequate infrastructure and a lack of appropriate courseware in some subjects. According to Hyland's (2003) study of academic staff from the Department of Theology and Religious Studies at the University of Otago, some felt that they had no real understanding of how computers and the internet worked from a technical perspective. They also found that working with technology could be stressful and tended to be less tolerant of technology's limitations and more frustrated by its lack of dependability. This group was found to be the least likely to commit to any form of computer-based teaching. A consortium of research organisations led by the Social Informatics Research Unit at the University of Brighton (2003) carried out a multi-faceted research project into 'Managed Learning Environment' (MLE) activities in further education and higher education (HE) institutions in the UK. Among the top five disadvantages of MLEs noted by faculty were the heavy reliance on having a stable infrastructure and/or IT system, dependence on software systems vendors, and the importance of system security and data security.

Somewhat more positive findings were reported by Fredericksen et al. (2000), who examined factors that have contributed to the high level of faculty satisfaction with an online instructional programme created for the 64 colleges of the State University of New York. Approximately 51 percent of the faculty felt that technical difficulties did not affect their teaching at all. Another 16 percent felt that, although technical difficulties had affected their teaching, these were no greater than those experienced with classroom teaching. Approximately 31 percent felt that technical difficulties made their teaching experience somewhat more difficult and only 2 percent felt that such difficulties made their teaching experience much more difficult.

Managers' survey

Not included in the survey.

Case studies

Ready access to equipment like computers, printers and projectors was a major issue for faculty in two of the polytechnics surveyed in the case study. In these institutions faculty argued that facilities were unevenly distributed and that some of the hardware supplied to them was inappropriate for their courses. Some faculty complained that they did not have access to appropriate hardware in their offices or workplaces. Faculty working off campus were most affected in this regard. Faculty appreciated the provision of hardware in classrooms and lecture theatres but they claimed that this was often hard to access. Some faculty argued that institutional spending on hardware was poorly planned and uncoordinated.

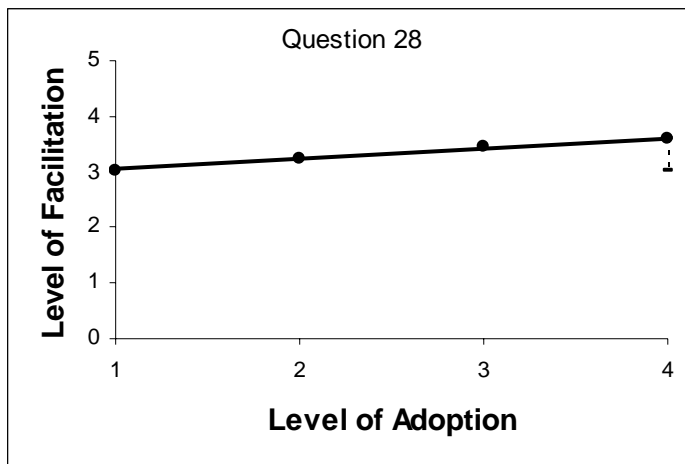
Analysis of policy documents

Not addressed in policy documents.

Tutors' survey

With a mean of 3.36, it seems that tutors in general considered their experiences of the reliability of computer technology to be neither facilitating nor inhibiting, but with a trend towards the former. The facilitation factor of 0.51 suggests a low positive relationship between tutors' levels of e-learning adoption and their ratings of the reliability of computer technology.

Figure 49. Effect of tutors' experiences of the reliability of computer technology on their adoption of e-learning.

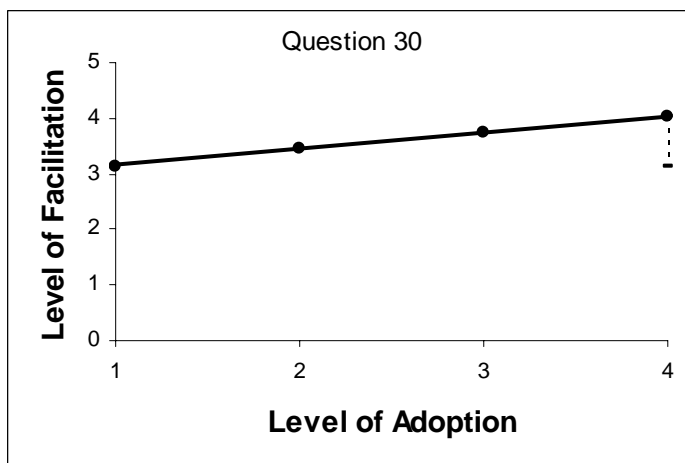


Mean for total sample: 3.36

Facilitation factor: 0.51

A related issue is tutors' tolerance of changes in computer software. This yielded a mean of 3.63, indicating that tutors in general were equivocal about whether it was facilitating or inhibiting (Figure 50). However, as with the bulk of the other variables, there were differences of opinion within the sample, with Embracers rating it as facilitating and Refusers/Doubters as trending towards inhibiting (facilitation factor 0.88)

Figure 50. Effect of tutors' tolerance of changes in computer software on their adoption of e-learning.



Mean for total sample: 3.63

Facilitation factor: 0.88

Conclusions and implications

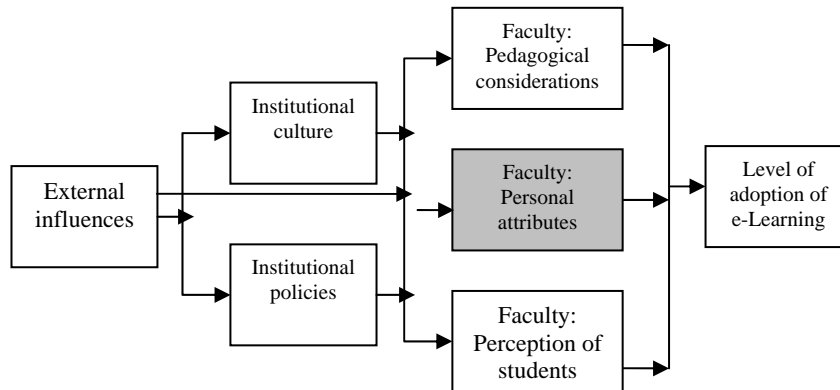
Access to physical resources was a major issue for faculty surveyed in international literature. In many of these studies access to computers and other technology was the dominant factor inhibiting the use of e-learning tools. Faculty were also concerned that equipment was often unreliable. This was particularly frustrating for faculty who were unfamiliar with computer technology and software. The literature points out the need for an effective institutional infrastructure that allows ready access to appropriate equipment. Tutors surveyed in this project did not consider computer reliability to be either a facilitating or an inhibiting factor. However, faculty at two of the ITPs participating in the case studies saw access to equipment as a major issue. They claimed that while some departments were well equipped others had no access to computers in their workplace. Faculty also commented on the need for their institutions to rationalise the purchase and distribution of equipment and software.

It is obvious that institutions cannot introduce e-learning if faculty do not have easy access to appropriate equipment. As important as the equipment, is an infrastructure that allows effective distribution and allocation.

CHAPTER EIGHT

MAJOR FINDINGS

FACULTY: PERSONAL ATTRIBUTES



8.1 Introduction

In this chapter, we outline findings on the relationships between personal attributes of faculty and how these relate to their decisions to incorporate e-learning into their teaching. These factors include feelings of adequacy in using technology, predisposition to innovative behaviour and acceptance of the different relationships with students engendered by e-learning.

8.2 Variable #26: Feelings of adequacy in using technology

Literature

It is one thing to feel confident that the technology underpinning e-learning is reliable (as discussed in the previous section); it is quite another matter to feel confident in actually using the technology in teaching. Several investigations have presented findings bearing on this issue. Thus, in her analysis of 102 articles on factors that motivate faculty to teach at a distance, Parker (2003) noted that ability to use new technology occurred in 46 of them. Not surprisingly, then, in her model aimed at predicting the level of adoption and utilisation of instructional technology, Park (2003) listed computer experience among the five critical factors. More specifically, in his report on the results of a study of lecturers in a UK university, Bennett (2001) found that feelings of personal inadequacy *vis-à-vis* the application of technology was viewed as an important barrier to adoption; however, there was no substantive evidence that technophobia inhibited the implementation of new technologies. In a similar vein, Butler & Sellborn's (2002) investigation of barriers to adopting technology for teaching and learning as perceived by faculty members in a college of sciences and humanities in an American university rated knowledge of how to use the technology as the second most important factor affecting the adoption of technology (after the reliability of the technology). In another study, Haywood et al. (2000) found that while academic staff in Scottish institutions of higher education had generally positive attitudes to the role of technology in education (67 percent rating its potential as high or very high), 33 percent expressed personal resistance to the use of technology in general and 25 percent stated they lacked IT skills. In a further UK study, Naidu (2003) investigated barriers to faculty employing web-based provisions. Included among the six most significant barriers were a lack of knowledge and understanding of WebCT and a concern about their own IT skills. In

their Massey University study, Pajo & Wallace (2001) found that 44.6 percent of their respondents rated their lack of knowledge/skills as being a strong or very strong barrier to their adopting e-learning. On the other hand, only 6.7 percent rated a dislike of computer technologies in teaching as a significant barrier. On the basis of her study of study of faculty members in a US university,

Against the above trend, in their study of factors that deter faculty at a community college in the South-eastern part of the United States from participating in distance education, O'Quinn, & Corry (2002) found that a lack of technological background was rated only as being neutral.

Managers' survey

As portrayed in Table 37, the e-learning managers rated tutors' technological literacy as a moderately to very important determinant of their decision to adopt e-learning. The mean rating of 3.83 placed it towards the middle of the 27 variables explored.

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' technological literacy	3	10	4	1	0	3.83

Table 37. e-Learning managers' ratings of tutors' technological literacy as a driver of e-learning.

Case studies

More than half the faculty interviewed in Case Study One rated their competence with e-learning B or above on the e-learning competency scale used in the introduction to the case studies. In Case Studies Two and Three, more than half the faculty interviewed rated themselves as C or below. All the tutors interviewed, even those who rate themselves as A, claimed that they would need to continually update and improve their technological skills. However, even those tutors who admit to their skills being only adequate, or less than adequate, did not see this as a barrier to implementing e-learning in their programmes. Tutors were conscious of the need to gain confidence in the use of e-learning technologies, but most did not consider their relative inexperience a major obstacle to their adoption of e-learning, provided that their institution could provide them with time and opportunity to learn new skills and with support and guidance where this is necessary.

It's about knowing what you are doing. That's important, and having the time and the expertise to prepare something very good. (Case Study 1, p.24)

I think we need to sit down and talk together about where we're at and what skills or what help we need to take it to the next step. (Case Study 1, p.24)

I'm learning something new everyday and I'm certainly not a step ahead of my students, because they're way ahead of me in knowing what to do, but I'm developing those skills as I go along. (Case Study 2, p.40)

When you see a practical example of something it starts triggering your mind as to how you yourself might be able to use that one. (Case Study 3, p.54)

One of the barriers is not having those kind of conduit people always available to us. We need access to them, and they need to be resourced to help us so that we don't all have to start from square one. (Case Study 3, p.54)

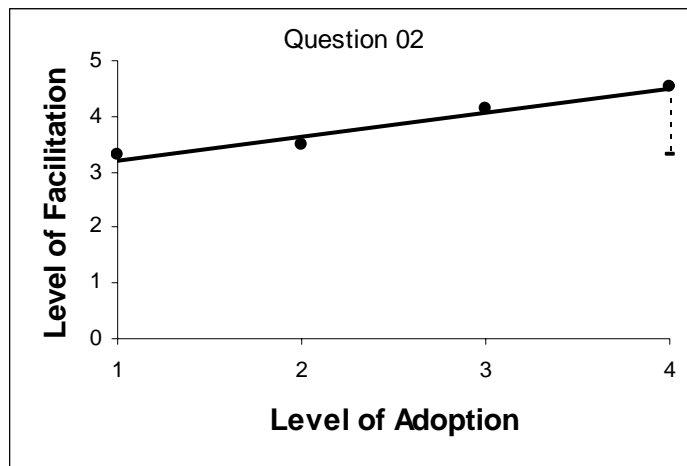
Analysis of policy documents

This was not generally addressed in the policy documents; however there were general statements in relation to assistance with professional development being available to ensure staff had the competencies required for e-learning.

Tutors' survey

With a mean of 3.89, it seems that tutors in general considered their technological competence to be rather more facilitating than inhibiting (Figure 51). The facilitation factor of 1.20, the third highest recorded for the 30 variables, suggests a moderately positive relationship between tutors' levels of e-learning adoption and their ratings of technological competence.

Figure 51. Effect of tutors' technological competence (e.g., skill in using online tools) on their adoption of e-learning.



Mean for total sample: 3.89

Facilitation factor: 1.20

Conclusions and implications

As Papert (1996) points out, 'technological fluency' is just as important as technological competence. He suggests that 'technological fluency' is about having the confidence to keep trying and to persist with the technology until users get the result they want. Confidence and feeling adequate with the technology is an important factor in the adoption of e-learning. Tutors need time allocated to gain and maintain technical competence and build their confidence – a range of accessible and well-planned development opportunities, including mentoring and peer support, can assist this.

8.3 Variable #27: Predisposition to innovative behaviour, accepting challenges, develop new ideas, internal rewards

Literature

To a greater or lesser degree, adopting e-learning approaches requires replacing more traditional approaches to teaching. Such a move requires at least an openness to change, if not a wholehearted embracing of it. As noted in an earlier section of this report, Rogers (1995) theorised that individual adoption rates of innovation are usually distributed along a bell-shaped curve and can be grouped under five categories: innovators, early adopters, early majority, late majority, and laggards. According to Rogers, at one end of the continuum, innovators tend to be venturesome, have a favourable attitude towards change, a favourable attitude towards science, change agent contact, and information-seeking behaviour.

Innovativeness is negatively related to dogmatism and fatalism. At the other end of the continuum, laggards are traditionalists, whose main point of reference is the past; they are suspicious of innovations and change agents.

According to Parker's (2003) analysis of 102 articles on factors that motivate faculty to teach at a distance, self-satisfaction figured in 90 of them and intellectual challenge in 51. Examples of specific studies include Betts's (1998) analysis of the top five factors that motivate faculty to participate in distance education. Of these factors, two were related to attitudes towards innovation: opportunity to develop new ideas, and intellectual challenge. Similarly, Giannoni & Tesone (2003) found that among the factors that inspire senior faculty members to participate in course delivery through online learning environments, intellectual challenge ranked third and personal satisfaction fourth. Schifter (2000) also carried out a study of factors that motivate or inhibit faculty to participate in asynchronous learning networks, finding that the top five motivating factors included the opportunity to develop new ideas. In another study, Miller & Husmann (1999) examined faculty incentives to participate in distance education. Data were obtained from a national sample of community college faculty who used some form of distance learning technology, excluding correspondence programmes. They found that faculty motivation for becoming involved in distance education centred most strongly on internal rewards (mean 4.48 on a 5-point Likert-type scale), enjoyment of teaching (mean 4.32), and professional challenge (mean 4.32). The authors concluded that faculty generally teach in distance learning programmes for the same reasons they teach traditional courses: for internal rewards. A similar conclusion was drawn by Wolcott & Betts (1999), who found that faculty were not enticed to teach distance education courses by the promise of some external reward but, rather, they participated to fulfill one of several personal or socially derived satisfactions. Many accepted distance education as a personal challenge to improve their teaching and to develop competence in using new delivery media and innovative techniques.

An interesting point was made by some participants in Hyland's (2003) University of Otago study who indicated that having a positive attitude to innovation and change was not in itself sufficient to convince them to experiment with new teaching methods. Responses showed that participant fears about using online technology and being able to teach successfully with an unfamiliar medium took precedence.

Managers' survey

Tutors' openness to change was given one of the highest ratings by the e-learning managers as a determinant of tutors' decisions to adopt e-learning, with 15 of the 18 considering it to be critically or very important (mean of 4.28):

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' openness to change in general	8	7	3	0	0	4.28

Table 38. e-Learning managers' ratings of tutors' openness to change as a driver of e-learning.

Case studies

Most of the tutors interviewed claimed they are already innovative in their teaching, often introducing and trying new methods and resources. They agreed that their motivation to try new systems is higher when the benefits of change are clearly articulated.

Analysis of policy documents

Three ITP policies included short statements which, although they did not directly refer to e-learning, they outlined attributes they valued in relation to innovation and change. Examples included:

We value and encourage diversity and originality, freeing one another to innovate and use creative ideas that work.

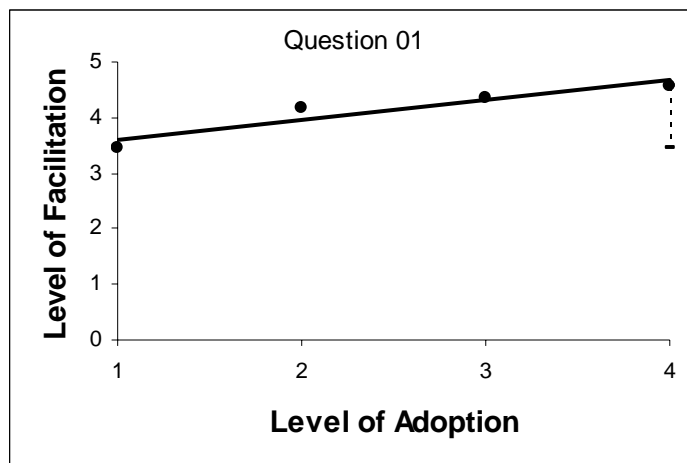
We respond well to challenges and find new ways to solve problems.

Develop a healthy and dynamic work environment for staff that understands and is accepting of change; nurtures contribution, innovation and development and which recognises and rewards staff in a supportive and accountable environment.

Tutors' Survey

The mean rating for this factor was 4.23, suggesting that, overall, the tutors considered that their openness to change facilitated their use of e-learning in their teaching. This was the highest mean for the 30 variables explored in the study. The facilitation factor of 1.08 indicates that Embracers were much more likely to see their openness to change facilitating their adoption of e-learning than were the Refusers/Doubters, with the other groups falling between these two extremes.

Figure 52. Effect of tutors' openness to change in general on their adoption of e-learning.



Mean for total sample: 4.23

Facilitation factor: 1.08

Conclusions and implications

Adopting e-learning involves more than just learning how to use new technology. Tutors adapting their courses to accommodate e-learning find that they need to utilise new techniques and change the way they think about teaching and learning. International literature suggests that the most important factors in initiating such innovation are intellectual challenge and personal satisfaction. That is, motivation is internal rather than external. The e-learning managers surveyed in this project considered 'openness to innovation' to be a major driver in adopting e-learning. Fifteen of the 18 managers surveyed rated 'tutor openness to innovation' as critically or very important. The tutors' survey indicated that Embracers were more open to change than Doubters. This suggests that successful experiences with e-learning tools lead to a greater willingness to try new ideas. Tutors in the case studies argued that good teachers are

already innovative, always looking for ways to improve their teaching and student learning. If this is the case, and if successful experience leads to further innovation, professional development programmes probably need to focus on helping tutors who identify as Doubters and Refusers to experience success with e-learning on their own courses.

8.4 Variable #28: Positive attitudes and beliefs about e-learning

Literature

For faculty to commit themselves to incorporating e-learning approaches into their teaching, they should have positive attitudes and beliefs about e-learning, at best, or, at the least, no negative attitudes and beliefs. The importance of attitudes and beliefs (sometimes referred to as 'culture') comes through quite strongly in many commentaries on e-learning. For example, according to Jaffee (1998), there are considerable obstacles preventing the widespread implementation of e-learning. He argues that these obstacles, and the associated forms of opposition and resistance, must be analysed in an organisational context that examines the prevailing academic culture and the widely institutionalised value placed on classroom-based teaching and learning. He thus believes that 'The recognition of the classroom as a sacred institution in higher education, and a major source of professorial identity, is a necessary first step toward developing strategies for organisational change and pedagogical transformation' (p.21). Jaffee further argues that in order for institutions of higher education to undergo significant transformation, changes must be approved, accepted, and ultimately put into practice by the teaching faculty. He recognises the difficulty in bringing about such changes given that, in 'loosely coupled' organisational systems such as universities, while the administration is formally in a supervisory and authoritative role, in actual practice the system of faculty governance, alongside a weak enforcement and discipline structure, render many administrative directives impotent. Of particular significance to those charged with changing the culture, Jaffee introduces the notion of 'deinstitutionalization', defined by Bowles & Gintis, (1986) as 'the process by which the legitimacy of an established or institutionalized organizational practice is eroded or discontinued' (p.564).

Through a literature review, Scrimshaw (2004) sought to identify the factors thought to be most effective in enabling and encouraging the uptake of ICT by teachers. He notes that since the majority of teachers tend to prefer to use a variation of a 'teacher-centred' model, it means that for them to make full use of ICT in their work it is necessary for them to make radical changes to the way they teach. Since the personal characteristics of teachers influence the extent to which they take up an innovation, this may result in the need for different approaches to ICT implementation for different teachers, with a combination of approaches to suit the level of progress that staff individually and as a whole have already reached. This point is also emphasised by Wilson & Stacey (2004) who recommend that institutions approach staff development from the perspective of designing support that is aligned to the levels of need and/or readiness levels of the academic staff.

According to Stone & Villachica (2003), successful change depends on time and opportunities for people to 'buy in' to the change. Technology based solutions change the work people perform and the roles they play in their organisations. e-Learning solutions can change the very nature of the jobs they do, how they perform them, and the consequences of their performance. For these reasons according to Stone & Villachica (2003), change management effort lies at the heart of successful implementation. Users can be expected to resist or even sabotage what they fear. Successful implementation requires that people willingly accept their changed jobs and roles within the organisation. To this end, the authors propose a three-phase programme for successful change.

Managers' survey

Not directly explored in the survey, but see variables #21 and #22.

Case studies

Tutors interviewed in one institution were unanimously enthusiastic about the benefits of e-learning. While they did not have a great deal of experience with this kind of learning and teaching, they were convinced of its benefits to their teaching, their students and to the institution as a whole. Tutors in the other two institutions were generally positive, but many had reservations. They were willing to accept e-learning if management provided time and other incentives that would allow them to develop quality course and if it could be proved that e-learning will allow them to do a better job.

I think we've started something really good. I don't think management can do any more. They've actually opened the doors. (Case Study 2, p.38)

You are surrounded by people that are very enthusiastic and committed, I'm a lot more cautious than that, although I'm committed to exploring it, I'm very cautious about its actual benefit. (Case study 3, p.51)

When we are getting so closely measured by contact hours, there has to be acknowledgement for training and putting these programmes together so the pressure doesn't come on us when we are told we haven't done enough contact hours and we have too many tutors. These issues are very real for us. (Case Study 1, p.24)

Analysis of policy documents

The following is a relevant extract from one ITP policy in relation to this variable:

By e-savvy, we mean an organisation where all staff are confident and competent operating in an electronic environment and have the skills to do so at the level required for their job. Appropriate ICT competency will be a basic requirement for all positions, supported by a comprehensive training programme. This includes a rolling assessment of individual, team and organisational ICT training needs. More targeted training and development will also support strategic areas such as e-learning.

Tutors' survey

Not directly explored in the survey, but see variables #5, 6 and 21.

Conclusions and implications

Developing confidence with the e-learning environment – the concept of technological fluency (Papert, 1996) - is a key factor in tutorial staff developing more positive attitudes and beliefs about successfully participating in the e-learning environment. Another factor is management response to staff concerns. When management addresses the concerns of staff, faculty will respond positively and express interest in being involved in online work (Boschmann, 1998). These areas of concern include time for course development, assistance with learning the technical and pedagogical skills required, and reduced workloads when running an e-learning course for the first time – these variables commented on in more detail in other sections of this final report. It is essential that management does not underestimate the effort required to achieve significant positive change in the learning 'culture' of their institution in terms of beliefs in and attitudes towards e-learning. While Embracers may be intrinsically motivated and positive in their attitude and beliefs, Examiners and Doubters (as defined in this study) will need more overt intervention (such as exposure to exemplars, peer

support and professional development) to move to the more positive end of the attitudes and beliefs continuum in relation to e-learning.

8.5 Variable #30: Acceptance of different relationships with students

Literature

At a minimum, e-learning involves replacing traditional face-face contact between tutors and their students and among students with new forms of interaction and, often, new types of relationship. As O'Quinn & Corry (2002) point out, the development of e-learning technologies has created conditions that require faculty to adapt to a new way of teaching and communicating with their students. They require not only that faculty learn how to use new technologies, but they also require a paradigm shift in how educators orchestrate the act of learning, how to personalise their instruction and how to incorporate student involvement activities into their instruction. In a related point, O'Quinn & Corry note that it is a somewhat foreign practice for many faculty to plan interactive strategies in advance of course delivery as they are accustomed to relying upon verbal cues and the spontaneity of classroom discussion to serve as a catalyst for interaction. Similar points to those discussed by O'Quinn & Corry are expressed by Bower (2001). In an opinion piece on faculty resistance to participation in distance education. Bower notes that faculty are accustomed to being the experts and that a fear of appearing incompetent may cause them to resist involvement in any activity for which they have not had the proper training, including appearing on camera or conducting classes via a computer. Most faculty, he avers, expect and are accustomed to direct engagement with their students. He cites the 2000 *American Faculty Poll* as confirming this in its finding that one of the most important factors for faculty in their decision to pursue an academic career was the enjoyment of working with students. In another opinion piece, Errington (2001) notes that protagonists of flexible learning are seen to value a learning management approach as opposed to an 'academic as expert' approach. This involves greater equity in teacher-student power relationships, diversity of student population, equity of learning access, independent learning, negotiated learning tasks, a variety of learning media delivery and opportunities for reflective learning.

Jaffee (1998) points out that because e-learning represents a very distinctive and radical application of instructional technology, the question is not whether faculty will actually teach in this way but whether they will accept or actively oppose the introduction or implementation of e-learning as part of their institution's curriculum and mission. Essentially, according to Jaffee, e-learning involves virtual classrooms that 'dematerialise' the physical classroom setting. It is this feature, Jaffee believes, that poses the greatest perceived threat and, accordingly, prompts the most negative reaction from faculty. For many faculty, teaching without a classroom is not viewed as an 'attractive' alternative and it may be viewed as too heavy a cost, regardless of the other positive benefits. For many, it represents such a radical departure from prevailing practice that it is incongruous with their understanding of the essential nature of teaching and learning. Jaffee concludes that since e-learning shifts a considerable amount of power, authority, and control from the faculty to the students, many faculty may have a vested interest in preserving and defending the classroom institution. 'The computer screen may be viewed as a totally unacceptable alternative for those who shape their identity through face-to-face interaction, an animated teaching performance, and an embodied human response' (Jaffee, 1998, p.27).

In a word, the issue seems to revolve around faculty acceptance of the need to form different relationships with their students.

What, then, is the evidence? Of 32 published case studies of barriers to using distance education analysed by Cho & Berge's (2002), seven identified the quality of social interactions as a key barrier. They described these concerns as follows:

Participants in distance learning courses can feel isolated due to lack of person-to-person contact. Some educators and students are uncomfortable with the use of student-centered and collaborative learning activities on philosophical grounds, or because these methods are usually a change from the traditional social structure of the classroom. There are concerns about the quality of distance learning courses or programmes, the possible lack of prerequisite skills and knowledge of students, and student learning. The outcomes of student learning in distance education, as well as the testing and assessment of student outcomes are concerns.

Several specific research studies present findings in a similar vein. For example, in Betts's (1998) US study, faculty who did not participate in distance education included among their reasons a concern about not having the face-to-face interaction that is found in traditional classrooms. Similarly, Dooley & Murphrey (2000) found that both administrators and faculty in a US university indicated the loss of interaction between faculty and students as weaknesses of e-learning. In a survey of faculty who taught online in a US university, McKenzie et al. (2000) found that one of the most frequently mentioned barriers was the decreased live, face-to-face interaction with students. In a study in two colleges in a US university reported by Rockwell et al. (1999), administrators felt that faculty concerns about teaching via distance included a decrease of personal contact with students, thus inhibiting faculty members' ability to get a feel for their students' capabilities. And, finally, Hyland (2003) reported that some staff from the Department of Theology and Religious Studies at the University of Otago disliked the notion of communicating with students through a machine, believing that the dehumanising features of online teaching would adversely affect the quality of tuition. In particular, they regretted the lack of the dynamic element present in face-to-face teaching.

Against the above trend, Fredericksen et al. (2000) describe an on-line instructional programme created for the 64 colleges of the State University of New York and examine factors that have contributed to the high level of faculty satisfaction with the programme. When asked to rate how well they knew their on-line students relative to their classroom students, 64 percent of the faculty felt that there was at least no difference, with 7 percent responding that they knew their on-line students much better, another 33 percent stating they knew them better and 24 percent feeling they knew them the same. Approximately 35 percent felt they did not know their on-line students as well and another 1 percent felt that they did not know them at all. The survey asked the faculty to rate the level of interaction between students in their on-line classes relative to students in the traditional classroom. Approximately 48 percent felt that the level of interaction between their on-line students was higher or much higher than that of their classroom students. Two-thirds of the respondents felt that there was at least no difference. Approximately one-third felt that the level of interaction was lower for their on-line student than for their classroom students. Results of studies of staff participating in the University of Waikato's Mixed Media Programme also lead one to be cautious in concluding that e-learning necessarily leads to less satisfying staff-student relationships. In Barr's (2000) report on interviews of participants in the programme, a number commented on what they considered to be an important intrinsic advantage of the approach, the opportunity to develop a close personal relationship with distance students. Donaghy & McGee's (2003) report contained two somewhat contradictory observations. While some expressed a concern at losing out on face-to-face teaching, they also felt that

online courses enable lecturers to get to know their students quicker than in face-to-face situations.

Managers' survey

The e-learning managers views on tutors' feelings of comfort with less direct control over their teaching as a driver of their adoption of e-learning were spread across a wide spectrum, with a mean rating of 3.50 (see Table 39).

Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Tutors' feeling comfortable with less direct control over teaching	2	8	5	3	0	3.50

Table 39. e-Learning managers' ratings of tutors' comfort with less direct control as a driver of e-learning.

Case studies

Management and faculty in all three institutions recognised that introducing e-learning could result in a significant change in tutor-student relationships. A minority of faculty saw this as a problem, but most were certain that they could cope with this change.

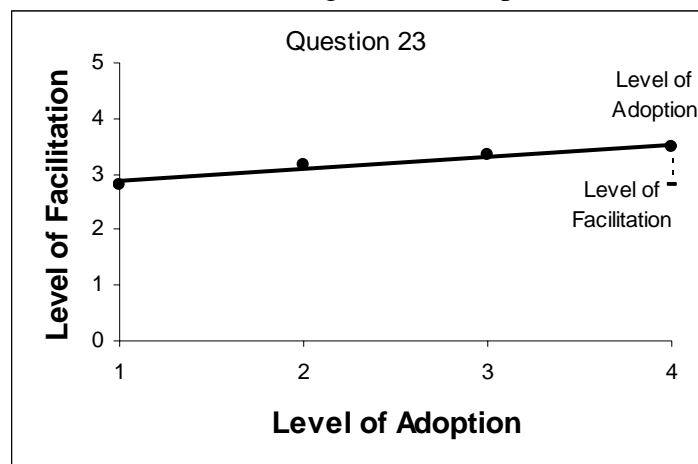
Analysis of policy documents

Not addressed in policy documents

Tutors' survey

With a mean of 3.26, it seems that tutors in general were only moderately concerned that e-learning would give them less direct control over their teaching, although there was a slight trend towards seeing it as having an inhibiting effect. The facilitation factor of 0.66 indicates a moderately positive relationship between tutors' levels of e-learning adoption and their concern about the possibility of reduced control over their teaching.

Figure 53. Effect of tutors' comfort with the idea that e-learning will give them less direct control over their teaching on their adoption of e-learning.



Mean for total sample: 3.26

Facilitation factor: 0.66

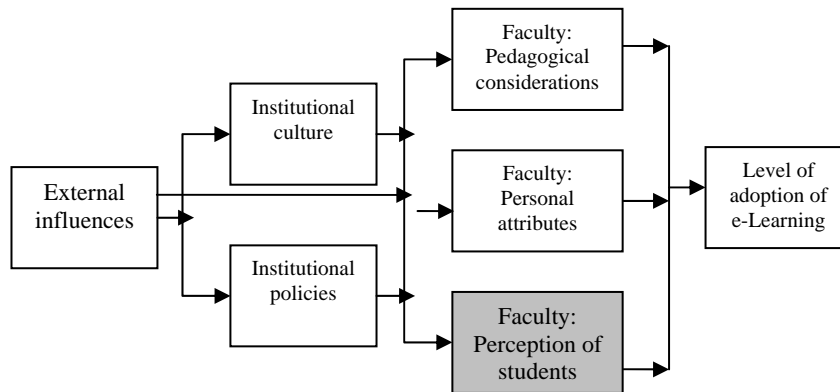
Conclusions and implications

Overall, it seems that there is mixed evidence as to the perceived impact of e-learning approaches on the nature of the student-teacher relationship. Our study showed no clear relationship between these two factors. Certainly, there was no evidence that tutors were unduly concerned at how e-learning does or could impact on their teaching role and their relationships with their students, this finding generally holding true across the spectrum of e-learning adoption. It would be interesting to probe more deeply into this pattern of results. Could it be that e-learning has become more widely understood and accepted over time? Or could it be that tutors rarely use a 'pure' form of e-learning but, instead, blend it with more traditional approaches to teaching, thus getting the best of both worlds?

CHAPTER NINE

MAJOR FINDINGS

FACULTY: PERCEPTIONS OF STUDENTS



9.1 Introduction

In this final set of results, we consider the relationship between faculty perceptions of students and their decisions to incorporate e-learning into their teaching. Two factors will be considered: the desirability of reaching new audiences, and reliance on students' ability to deal with e-learning technology.

9.2 Variable #33: Recognition of desirability of reaching new audiences (see also variable #3)

Literature

In Parker's (2003) analysis of 102 articles on factors that motivate faculty to teach at a distance, accessing a wider audience was noted in 72. Not surprisingly, then, several articles studied for the current project gave prominence to this issue. For example, Dooley & Murphrey (2000) present the results of a study of how the perspectives of administrators, faculty, and support units in a US university impact the rate of distance education adoption. From the five categories that surfaced, the motivation most frequently expressed by all groups was expansion of the audience base to reach nontraditional students. In another US study, Betts (1998) found that the ability to reach new audiences that cannot attend classes on campus rated among the top five factors that motivated faculty to participate in distance education. Likewise, Rockwell et al. (1999) found that 67 percent of faculty in two US universities rated increased access to place-bound students as an incentive for undertaking distance education, 58 percent noting the reduction of student travel time as an incentive. Similar results have been reported by Colaric, Taymans & Booz (2004), Deaton & Singleton (2004), Donaghy & McGee (2003), McKenzie et al. (2000), the Social Informatics Research Unit at the University of Brighton (2003).

A somewhat cynical view of the capacity of e-learning to reach new markets was expressed by Zemsky & Massy (2004) in their publication, *Thwarted Innovation*. In questioning the validity of the assumption, 'If we build it they will come', they point out that, despite massive investments in both hardware and software, there has yet to emerge a viable market for e-learning products. They note that in the six institutions participating in their study, more than

80 percent of their enrollments in online courses came from students already on their campuses. They also reported that agreement with the proposition that e-learning has the capacity to reach new markets actually declined between two studies repeated 15 months apart.

Managers' survey

When asked about their views on management-level drivers of e-learning, the managers expressed a range of views on the relative importance of attracting new markets, but generally rated it quite high, with a mean rating of 3.72. As can be seen in Table 40, 10 of the 18 rated it as being critically or very important, the remaining 8 rating it as being moderately important.

Driver	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Attracting new markets	3	7	8	0	0	3.72

Table 40. e-Learning managers' ratings of attracting new markets as a driver of e-learning.

Case studies

Management and faculty were aware of the ways that e-learning can create opportunities for extending the boundaries of courses in which they have a specialist advantage. The flexibility that e-learning provides means that mature students, students returning to the workforce and students in remote areas can participate in institutional programmes. This increased participation could require new pedagogies and the use of new technologies.

Analysis of policy documents

Many of the ITPs' policy documents, particularly in ITPs based in remote geographical areas, referred to e-learning as an opportunity to increase educational access to their dispersed communities. Others outlined the opportunity for professionals in work having the opportunity to study at their own place in their own time. In addition to providing greater access in their own communities, some of the smaller ITPs acknowledged they can reach new audiences for programmes in which they have special expertise. One of the larger ITPs recognised the opportunity of reaching new audiences offshore:

We are committed to contributing to New Zealand's export education capability through developing learning design, e-learning and blended options for international delivery.

Tutors' survey

Not explored in the survey.

Conclusions and implications

International literature indicates that the potential to reach new audiences is a major incentive for institutions to adopt e-learning. The ability to increase enrolments by reaching new audiences is a major reason for adopting e-learning, according to researchers like Parker, (2003); Dooley & Murphrey, (2000); and Deaton & Singleton, (2004). e-Learning managers and faculty in this study also rated this issue as an important driver. This was apparent in surveys and in interviews. Management and faculty were aware of the ways that e-learning can provide a means of access to learning for mature students, students returning to the workforce and students in remote areas. e-Learning also allows institutions to extend the boundaries of courses in which they have a specialist advantage. The evidence we have has

been drawn from administrators and faculty not from students, but anecdotal evidence suggests that students, especially those normally denied access to tertiary education, appreciate the access and convenience that e-learning can provide. This is particularly true of institutions with a large rural hinterland but it is also relevant for urban institutions offering courses to students in full time employment.

9.3 Variable #34: Reliance on students' ability to deal with e-learning technology

Literature

Clearly, for e-learning to succeed, students must have access to a computer and possess a basic ability to handle the technology. Only limited evidence bearing on this issue could be found in the survey of the literature, and it was mixed. In a small-scale study of participants in a professional development course on online learning in distance education, Colaric, Taymans & Booz (2004) found that most thought that students, as well as instructors, were not prepared for distance education. In a similar vein, in Wilson's (1998) study of early-adopters of e-learning at a US university, 39 percent rated student familiarity with computers as a significant or major concern). Also, in their South African university, Cronje & Murdoch (2001) noted that one of the problems experienced with WebCT was the difficulty in ensuring student participation. In contrast to the tenor of these findings, in their investigation of 11 potential barriers to integrating technology into their teaching, Redman & Kotrlik (2004) found that faculty rated their students' ability to use technology as only a minor barrier, rating it 10th. Similarly, in another finding from Wilson's (1998) study, student access to computers was rated as only a moderate concern, with only 16 percent seeing it as a significant or major concern.

Managers' survey

Three questions in the e-learning managers' survey addressed students' ability to deal with e-learning – their ready access to computers, effective orientation to software, and technical support. As can be seen in Table 41, all three received high ratings, with means of 4.33, 4.11 and 4.11, respectively.

.Factor	<i>Critically important</i>	<i>Very important</i>	<i>Moderately important</i>	<i>Little importance</i>	<i>Negligible/no importance</i>	<i>Mean</i>
Students' ready access to computers	10	4	4	0	0	4.33
Effective orientation programmes for students on e-learning software	5	8	3	1	1	4.11
Technical support for students' e-learning (eg, Help desk services)	7	8	1	2	0	4.11

Table 41. e-Learning managers' ratings of tutors' perceptions of student-related factors as drivers of e-learning.

Case studies

Faculty recognised that students face new challenges in e-environments. In these environments students need to be able to use systems effectively, to be e-information-literate and be able to retrieve, store and use reliable and relevant information from the web. Faculty considered that many students lacked these and other skills. In most instances this was because students lived in remote areas or because they are entering tertiary education from the

workforce. In some cases language and literacy skills were a barrier to using e-learning. Faculty claimed that many students had less experience with computers and fewer technological skills than was generally assumed by management and by tutors themselves. Tutors expressed surprise that, given the almost universal use of computers in today's schools, so many students were still relatively unskilled with technology.

I've been led to believe that everybody who comes out of school is absolutely computer literate. In reality, if you are saying that lots of people cannot do it, then e-learning does not have to be on the front burner but on the back burner. (Case Study 1,p.25)

I genuinely believe that students haven't got the computer literacy that we assume. (Case Study 1, p.25)

We've got 30% [of students] over 35. Quite frankly, a lot of them are scared silly. (Case study 1,p.25)

It puts you off because you suddenly get all these stressed out students who are not particularly willing in the beginning to engage in on-line learning. (Case study 1, p.25)

It varies hugely. Some are incredibly savvy. They show me what to do. Others have absolutely no idea and just can't cope with it all. (Case Study 3, p.1)

Some students are coming back into the workforce who maybe have never seen a computer before, just because of their demographics (2).

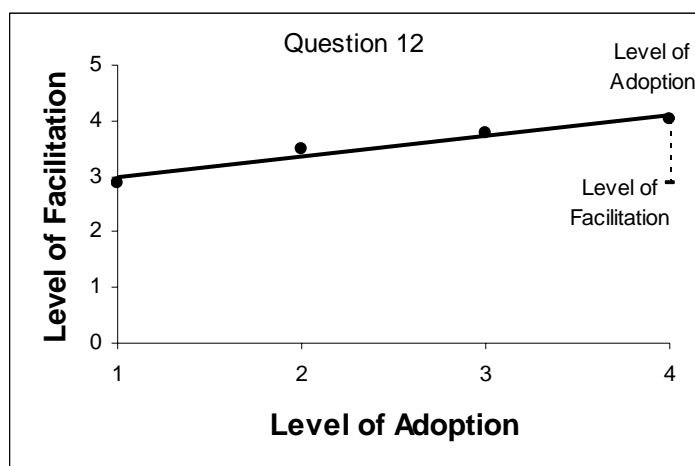
Analysis of policy documents

Not addressed in the policy documents.

Tutors' survey

With a mean of 3.63, it seems that tutors in general considered students' access to computers is rather more facilitating than inhibiting (Figure 54). The facilitation factor of 1.11 ranked near the middle of the 30 variables, suggesting a moderately positive relationship between tutors' levels of e-learning adoption and confidence that their students have ready access to computers. Given the ubiquitousness of computers, these results are unsurprising.

Figure 54. Effect of tutors' perceptions of the impact of students' ready access to computers on their adoption of e-learning.



Mean for total sample: 3.63

Facilitation factor: 1.11

Conclusions and implications

While 'meeting students' expectations' is a key driver encouraging managers and tutors to adopt e-learning, neither group considered students' ability or inability to deal with e-learning technology a major issue. Managers and tutors acknowledged the need for students to have access to computers and appropriate software, but for most, students' e-learning ability and experience with computers was a minor issue which can presumably be easily overcome. The international literature presents a similar view. Some surveys (e.g., Colaric, Taymans & Booz, 2004; Cronje & Murdoch, 2001) describe student ability to utilise computers as relatively important, but for most writers, students' ability to use technology is considered only a minor barrier (Redman & Kotrlik, 2004; Wilson, 1998).

The case study data presents a somewhat different view. A number of tutors interviewed claimed that students in many courses had only low-level computer skills and that many students, 'haven't got the computer literacy that we assume.' Of course, students in some courses are highly skilled and experienced in e-learning technology but this is often not the case with older students, students in remote areas and students entering courses from the workforce. Again, assumptions about students' abilities are drawn mainly from surveys of faculty and managers. Some real data on students' skills on entering ITPs would be useful to tutors, managers and professional development units. New Zealand school children now start using computers when they commence school at five, but we have little evidence to show how efficient they are with computers when they leave school to begin tertiary education.

The fact that even some students lack the skills that allow them to participate fully in e-learning suggests that additional tutoring might be necessary. Policy documents and interviews with e-learning managers indicate that tutoring in technology and the pedagogy of e-learning is planned in some institutions. One manager was able to identify policies that will provide support for students as well as faculty. As well as technical and pedagogical support, this institution will also provide corporate support for students less likely to use on-campus facilities like libraries, students associations and campus clubs.

CHAPTER TEN

CONCLUSIONS

10.1 Summary

As part of the government's Tertiary Education Strategy 2002-2007, the Ministry of Education is administering an e-Learning Research Fund to support the conduct of research into e-learning in the tertiary sector.

This report is the final one generated by the project, *Learning from Adopters and Resisters of E-Learning*, based at Waikato Institute of Technology, Hamilton, New Zealand. The main goal of this project was to investigate the factors that lead teaching staff in New Zealand Institutes of Technology/Polytechnics (ITPs) to adopt or resist the incorporation of e-learning approaches into their teaching practices.

For the purposes of this study, e-learning was defined as follows:

e-Learning is learning that is enabled or supported by the use of digital tools and content. It typically involves some form of interactivity, which may include online interaction between the learner and their teacher or peers. e-Learning opportunities are usually accessed via the internet, though other technologies such as CD-ROM are also used in e-learning. (Interim Tertiary e-Learning Framework, 2004, p.3)

The research had four main phases:

Phase 1: A literature search was conducted.

Phase 2: The managers of e-learning in all 20 ITPs were surveyed to determine their institutions' e-learning policies and the extent to which e-learning had been adopted. Eighteen managers responded, yielding a return rate of 90%. As well, an analysis of publicly available policy documents for each of the 20 ITPs was carried out.

Phase 3: Case studies were conducted in three ITPs. In these, the following tasks were carried out: (a) an analysis of policy documents pertaining to e-learning, (b) interviews with key management personnel with roles in e-learning, and (c) focus group interviews with a range of tutors.

Phase 4: Teaching staff in all New Zealand ITPs were surveyed online to determine what factors influence their adoption or rejection of e-learning. A total of 831 tutors responded to the survey, this figure representing 23.6% of full-time tutors.

A key aspect of the project was a category system that addressed tutors' levels of adoption of e-learning. Briefly, five categories were identified:

Embracers: advanced knowledge of e-learning/thoroughly familiar with Learning Management Systems (LMSs)/use e-learning to transform teaching...

Modifiers: understand e-learning tools and use selection of them/exploring LMSs/mainly focused on transmission of content...

Examiners: limited grasp of e-learning, but considering its possibilities/use low-threshold technology/exploring placing some material online...

Doubters: know a little/not actively exploring/satisfied with existing pedagogy...

Refusers: not interested/know little about e-learning/philosophically opposed...

Based on a review of the literature and the project team's familiarity with managing and researching e-learning, a range of variables was selected; these were grouped as follows:

The 'state of the art' of e-learning:

- Management of e-learning
- Tutors' levels of adoption of e-learning
- Tutors' rates of adoption of e-learning over time
- Tutors' levels of adoption of e-learning by gender, age, employment status, ethnicity and subject areas
- Tutors' use of a range of Web-based teaching technologies.

External influences on tutors' adoption of e-learning:

- Employers' expectations
- Students' expectations,
- Competition from other providers
- Institutional reputation.

The influences of institutional culture:

- Supportive culture, values, atmosphere, change orientation
- Acceptance of value, legitimacy of e-learning.

The influence of institutional policies:

- Development of long-term strategy
- Provision of professional development for faculty
- Provision of time to develop courses
- Provision of time to deliver courses
- Provision of financial resources for running costs
- Provision of administrative support/pressure
- Provision of technical support
- Provision of pedagogical support
- Negotiation of appropriate contracts, job security, workloads, consideration of time taken from research
- Resolution of legal issues, e.g., intellectual property rights
- Provision of recognition and rewards.

The influence of pedagogical considerations:

- Increased flexibility
- Recognition of obsolescence of traditional teaching approaches
- Appropriateness for subject area
- Assurance of quality outcomes
- Belief that e-learning is at least as effective as traditional teaching
- Enhancement of teaching and learning
- Support from, and modelling by, peers.

The influence of faculty members' personal attributes:

- Feelings of adequacy in using technology
- Predisposition to innovative behaviour, accepting challenges, develop new ideas, internal rewards
- Positive attitudes and beliefs about e-learning
- Opportunities to work in teams
- Acceptance of different relationships with students

- Confidence in access to reliable technology.

The influence of faculty members' perceptions of students:

- Recognition of students' motivations, interests and expectations
- Recognition of desirability of reaching new audiences
- Reliance on students' ability to deal with e-learning technology.

The results of the study are not summarized here as they are outlined in the Executive Summary.

10.2 Conclusions

It is difficult to do justice to over 40 major findings and many more subsidiary ones in what turned out to be a very complex, multi-faceted study. Nevertheless, four broad conclusions can be drawn:

Firstly, with regard to the central question of our study, namely what factors inhibit or facilitate faculty in their decision to incorporate e-learning into their teaching? The broad answer is that, depending on various circumstances, a particular factor may be seen as facilitating by some tutors and inhibiting by others. There is no clear demarcation point separating factors into two distinct groups. What is very clear, however, is that a complex array of factors come into play in influencing the extent to which tutors adopt e-learning. In this connection, we found that the model we developed to portray these factors proved to have high utility.

Secondly, there is wide diversity among tutors with regard to their levels of e-learning adoption and, similarly, with regard to the factors that influence these levels. This has ramifications for planning and delivering professional development. Clearly, one size does not fit all.

Thirdly, as with so many technological developments, it would seem that the majority of faculty, even the Embracers, are only scratching the surface of technology's potential.

Fourthly, there is wide diversity among ITPs in their commitment to and involvement in e-learning, with a few that are advanced and many that are only at the beginning stages. Institutions need to develop long-term policies and strategies that take account of rapidly shifting developments in technology and attendant pedagogy. They will also need to see expenditure in e-learning infrastructure as an investment that will become increasingly necessary in an increasingly competitive environment with heightened expectations from students and employers.

10.3 Limitations of the Study

With the triangulation approach we adopted in this project, we feel that we captured fairly well the state of the art of e-learning in New Zealand ITPs and factors that facilitate or inhibit faculty in deciding whether or not to incorporate e-learning approaches into their teaching – at least as was the case in late 2004. This latter point bears emphasis as it was very clear that the place of e-learning in ITPs (not to say other parts of the tertiary education sector) is going through a period of rapid development - and it shows every sign of continuing to do so. The findings of our study, then, are strictly time-bound.

Despite valiant attempts to increase the participation rate for the tutors' on-line survey, we were unable to obtain more than a 23.6% return. Although this rate is comparable to several other published studies, it clearly limits the extent to which we can assert that the findings are true of the whole ITP sector.

We were initially concerned that committed e-learning practitioners would dominate responses. There may well be a bias in that direction, but against that we note that half the respondents were not involved in developing or delivering e-learning courses at the time of the survey.

We should note, too, that there was a slight gender imbalance in the respondents to the tutors' survey, with females being overly represented compared with the national ITP gender ratio.

We would have liked to have carried out more sophisticated statistical analyses of the tutors' data, but the limited time available for the study, together with the complexity of managing data from a wide range of sources, precluded this. Nevertheless, we believe that we have managed to present some innovative ways of presenting the data. Should any researcher wish to pursue further analyses, we would willingly make our raw data available.

Finally, we recognise that although our study presents a comprehensive picture of the perceptions held by faculty and management, we did not gather data on the views of students or employers. We hope to fill that gap in a subsequent study.

10.4 Implications for Further Research

The present study has thrown up many issues that are worthy of further investigation. Five in particular are emphasised:

Firstly, more in-depth research should be carried out to explore the issue of time needed to develop and deliver e-learning courses. For example, is the considerable investment of time that early adopters put into developing courses in the early days of e-learning still necessary, or has the increasing availability of more sophisticated LMSs and technical infrastructure significantly reduced time requirements?

Secondly, what is going to be the impact of likely/possible changes in technology on e-learning in the future? How can institutions prepare for inevitable change when its parameters, by definition, are largely unknown?

Thirdly, what expectations, skills and experiences relating to e-learning do students bring to tertiary education? How rapidly are these changing?

Fourthly, what do employers and professional bodies expect regarding e-learning provisions in the future? Are they currently using e-learning in training staff in-house? Will they be increasingly likely to do so in the future?

Fifthly, what are the key features of professional development programmes that take account of results of studies such as the present one? How can professional development programmes accommodate to the wide range of e-learning-related skills and attitudes of faculty and managers?

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