1997

Strategy and Information Technology

Sandra Wills
University of Wollongong, swills@csu.edu.au

P. Yetton
University of New South Wales

Strategy and Information Technology

Abstract

Our research on twenty Australian universities charts a substantial shift in the importance of IT in teaching and administration, and in how they therefore play the strategy game.

Keywords

Disciplines

Arts and Humanities | Social and Behavioral Sciences

Publication Details

Strategy and Information Technology

Sandra Wills and Philip Yetton

Introduction

Strategy is a serious, challenging and creative game. It is serious because when an organisation makes a mistake, its competitors punish it severely. In contrast, when it gets it right, success brings significant rewards. There are winners and losers.

It is challenging and creative because in discovering, adopting and implementing its strategy, an organisation is confronted by the problems of uncertainty and ambiguity. The strategy game is a turbulent one in which everything keeps changing, including customers' needs, government policies, technology and competitors' strategies.

How do you predict that your competitor will develop a walkman? After all, who would want a tape recorder which couldn't record? If you were a bank in Australia in the early eighties, how would you have planned for the 'unlikely' event of a Labor government deregulating the banking industry? Banks which didn't exist then are now household names and without the protection of government policy, at least one of the major players would probably have been taken over.

(notes from a strategy lecture).

It is a game unlike many games we play. Teams don't just develop new tactics with which to win but attempt to move the goal posts, change the scoring systems and the rules. Teams who were not part of the competition at the beginning of the season, sometimes join in without being asked, and when they are not wanted.

Seen in these terms, some people would argue that education should not be part of such a game. However, the Dawkins' initiatives and the recent actions of the Howard Government have made it one, at least in some sectors of higher education. The question in this chapter is not only how universities are using technology to play this game either better or more efficiently, but also differently. When the game changes, major winners and losers emerge based on how differently they choose to play.

Our research on twenty Australian universities charts a substantial shift in the importance of IT in teaching and administration, and in how they therefore play the strategy game. Five years ago, IT was viewed by university management as experimental seeding on the edge of mainstream teaching, and as an expensive if necessary administrative resource. Now, the Vice-Chancellor of a major university talks about 'mainstreaming the digital revolution' (Alan Gilbert, Vice-Chancellor, The University of Melbourne).

All universities interviewed cited the main imperative for revisiting their strategic plans was the higher value placed now on teaching and the accompanying recognition

that the 'student as client' quality assurance push required a refocus onto student-centred and/or flexible learning. IT is seen as underpinning both flexible delivery and improvements in the effectiveness of student learning. A senior manager at Queensland University of Technology indicated that the next year was being called 'The year of the client', in order to refocus IT on the customer.

Previous imperatives such as improving the cost effectiveness and efficiency of administration has, in the main, taken a back seat or been diverted into the national collaboration on CASMAC (Core Australian Specification for Management and Administrative Computing). We analyse this in Chapter 4. IT for research is outside the terms of reference for this study.

It is important to make explicit what we mean by strategy. It is how one university competes or cooperates with another in order to improve its performance relative to other universities in the higher education sector. For example, it is easy to see how one university, by improving quality or lowering price, could compete with another to attract the international student. In the case where one university initiates an action that other universities can copy easily, we would not class that as part of the university's strategy, even if it is included in that university's strategic plan.

This definition of strategy focuses our attention on how universities differentiate themselves. This will include differences in how they measure success. If one university set out to be the best undergraduate teaching university in Australia, and another set out to be the best research university, both could succeed in their chosen market segment. And it is certain that they would manage themselves differently. It is these differences that are the primary focus of strategy. Within this agenda, we also include actions by universities to stop others establishing such differences. A good indicator of a focused strategy is what the university gives up, rather than what it says it plans to do. In this way, we can see what actions a university takes in order to focus resources on its core agenda. It also clearly distinguishes actual from espoused strategy. For example, a number of universities are now closing campuses (e.g. University of New South Wales, Queensland University of Technology) and programs (e.g. University of South Australia) to focus scarce resources on building their strengths.

Through competition, universities will develop stronger strategic identities. This chapter identifies three generic strategies that are emerging across different universities and some key potential impediments to their successful implementation. It begins with a basic overview of the increasingly significant role ascribed to IT by universities in their marketing and institutional image-building. It then identifies a number of strategic drivers underlying this increase.

In response to these drivers, universities can be seen to be differentiating themselves in terms of three generic or ideal type strategies. Each of these is essentially a strategic identity for a university. These are described with examples from the study. We then examine one major impediment to the implementation of strategic plans and seek to explain some of the difficulties and frustrations which are common to the

higher education sector. Finally, we consider briefly the context set by the Federal Government.

IT's New Image

The new strategic importance of IT is signalled by its prominence in how universities manage their public image.

- Deakin University's mission statement describes its teaching and research as 'distinguished by [the] use of leading-edge technologies which promote intellectual inquiry and discourse'. Its strategic plan lists as the University's first strategic imperative its intention to 'use imaginative and innovative approaches in the application of new technologies to enhance access, promote global intellectual inquiry and discourse and to drive flexible approaches to teaching, learning, research, program development and delivery.' The second strategic imperative includes among the elements of Deakin's distinctive style and direction, 'the application of new computer-based technologies and multimedia delivery techniques [which] must be employed as essential tools...'.

- The University of Technology, Sydney has signalled its intent to use technology as a differentiator in the NSW marketplace. Two important strategic plans, *Fashioning Our Future: a Vision for Information Technology in the UTS Community* and *UTS 2015*, have received substantial publicity.

Similar claims to particular expertise in the use of technology in teaching have been explicitly used to attract students with a preference for IT supported learning.

- Queensland University of Technology was announced as University of the Year, 1994, primarily based on its use of technology for teaching and widely celebrated that feature of the win in newspaper advertisements.

Instead of an existing expertise in IT, a number of universities claim an innovating role with respect to IT. Rather than emphasising performance today, they are making an ambit claim on establishing a reputation in the future.

- Monash University is sending strong signals to the academic market by hosting high level conferences on 'Virtual Universities' and advertisements with slogans such as 'We don't see a computer, we see a global classroom'.

- For the past three years, Monash and Wollongong Universities have signalled their presence as innovators to the market via the use of free to air television for broadcast of video lectures and distance education via PAGE (Professional and Graduate Education) on SBS and OLA (Open Learning Australia) on the ABC, and more recently on Optus Learning Channel. Other universities are involved in the PAGE and OLA consortiums but it appears Monash and Wollongong, as the drivers behind the formation of those consortia, have captured most of the exposure.

- Edith Cowan University signalled its intentions to the market early with the appointment of a Virtual Campus Coordinator in 1992. Initially the Virtual Campus impacted mainly on the teaching of Computer Science, but it now services approximately 8000 students and 700 staff (see Case Study 5 later in this chapter).

A strategy can also be based not on what a university might offer but instead on how its student client base is changing. The Vice-Chancellor of The University of Melbourne has expressed concern that the University's feeder high schools, particularly leading edge independent schools, are outstripping the University in their use of IT for teaching, and have been doing so for a number of years.

- Students and staff at schools such as Methodist Ladies College in Melbourne and John Paul College in Brisbane have been using laptops for several years.

- Every State in Australia has had 'Schools of the Future' projects for a number of years.

Students coming to university may increasingly not see sandstone and status as a sufficient condition for selecting their first preference university. Many universities appear to have been slow to understand that the student base is already computer literate on entering university. This perception may exist because many of the staff are not computer literate. The University of Melbourne began to survey enrolling students in 1993. These surveys reveal high levels of computer access. Around 70 per cent own PCs and another 10 per cent intend to buy. This access is much higher than lecturers and administrators had previously predicted. Surveys at Wollongong University begun in 1994 yield similar statistics for computers; however student access to modems poses challenges for the move into Internet delivery.

Finally, some universities have targeted both potential students and their future employers by focusing on the employment options for their graduates.

- Griffith University published its *Information Literacy Blueprint* widely in recognition of this need. 'Employers run information driven businesses,' and they expect graduates to be information literate (PVC Information Services).

- Wollongong University publishes its 'Attributes of a Wollongong Graduate' which acts as a warranty that graduates will be information literate, computer literate, statistically literate etc. (see Case Study 4).

These illustrations show just some of the ways universities are presenting their new and, more importantly, different strategic agendas to their stakeholders. They show how, as described in Chapter 1, universities seek to differentiate themselves from each other as they compete. The most important insight they provide is that there is no one way in which universities either will or should compete. The critical characteristic is the increasing variety of and differentiation among strategies.

Strategic Imperatives

The new images emphasise the differences among universities. Underlying them is a more limited set of differences. The interviews revealed six main imperatives for reviewing universities' IT strategies as bases for competition through differentiation in the 'market place':

- the need to improve the quality of teaching;
- the need to reduce costs;
- the need to service new but small multiple campuses;
- the competition for students;
- the changing profile of the student base; and
- inter-university collaboration.

Below we discuss the first five briefly and then explore some impediments to IT strategic planning to support these strategies. We then consider inter-university collaboration. We have partitioned the discussion in this way, because our interest is in how the first five contribute to differentiation, whereas the last is more likely to be the basis of performance where government policy discourages differentiation.

Quality Improvement

The above focus on IT is very recent. The University of Melbourne was one of the early leaders and its first strategic plan for IT in teaching (Interactive Multimedia Learning Unit, 1992) is less than five years old. It emphasised improvement in the quality of teaching and learning as the guiding principle for adopting IT. Projects were selected for seed funding on the basis of sound learning theories. The goals of the unit were focused on improving the quality of teaching and learning. For example, large group teaching in science wet labs were shown to be more effective and safer learning experiences when they were preceded with the use of multimedia simulations (dry labs).

Of course, quality can be improved along a number of different dimensions and different universities focus on different elements:

The University of South Australia places great emphasis on the quality of teaching and learning. In particular, it is using its experience in the delivery of distance teaching to encourage more flexible delivery of programs. Technology is seen as a tool to facilitate interaction between students and teachers and among students. The emphasis is on communication technologies and facilitation of deep student learning rather than on delivery technologies for knowledge transmission.

(from Case Study 3 in Chapter 1)

Quality can also be improved by increasing the resources and, in particular, the expertise committed to the program. Griffith University appointed Deputy Deans of Teaching and Learning in each Faculty as one strategy in assuring quality of course offerings. At the same time it established a small Flexible Learning Development Unit within the Griffith Institute for Higher Education and invited Diana Laurillard from the Open University in the United Kingdom to be a part-time consultant.

Improvement in quality may not require more resources so much as reflect a shift to meet an important student need. The University of Wollongong, as shown in Case Study 4, has focused on satisfying their students' need for flexibility - a shift which empowers the student.

Case Study 4: University of Wollongong: IT-based Flexible Learning

The University of Wollongong is a regional multi-cultural university of 1300 staff with centres in Sydney (postgraduate), Berry (undergraduate) and Dubai (postgraduate). There are three main strategic directions for the university.

- *Match the population growth in the South Coast by establishing small satellite campuses like Berry. These will be connected via videoconference as well as data communications.*

- *Grow the number of full fee-paying postgraduate students (to 23 per cent of 10,700 EFTSUs by the year 2000). Growth will include the option of delivery at a distance, via PAGE and SBS Television or via Wollongong OnLine.*

- *Grow the number of international students, currently at approximately 18 per cent, ranking the university in the top three destinations for international students. The university offers Foundation Studies and English Language through a subsidiary company.*

In 1996 a Flexible Delivery Plan was prepared, to integrate the best of distance education techniques with the best of on-campus techniques to provide flexibility of education for students, 'no matter where in the world they be'. Flexible delivery is defined as:

***Flexible delivery of courses**: selecting appropriate subjects from a variety of sources.*

***Flexible delivery of subjects**: selecting appropriate delivery techniques and/or technologies to enable students to choose how, what, when, where, and/or with whom to study.*

***Flexible delivery of content**: student selects appropriate teaching techniques to match own learning styles.*

Currently about 80 subjects are offered in flexible mode underpinned by technology. Most make large use of video in addition to print and disk. A number of them utilise on-line techniques for delivery of content and/or for communication between students, regardless of whether they are on or off

campus. There are a number of multimedia projects that impact on parts of traditionally delivered subjects.

The University publishes and annually refines 'The Attributes of a Wollongong Graduate' (Towards 2000, Strategic Plan 1992) as a warranty of the outcomes of the educational experience. Specifically, computer literacy and statistical literacy are compulsory.

Competencies

- *Is equipped for continued learning, intellectual development, critical analysis and creativity*
- *Has coherent and extensive knowledge in a discipline*
- *Communicates clearly and fluently in writing*
- *Has capacity for teamwork*
- *Has ability to solve problems and make decisions*
- *Is self-confident and orally articulate*
- *Reasons logically and distinguishes fact from opinion*
- *Is computer literate*
- *Is statistically literate*

Attitudes

- *Has the desire for continuing intellectual development and creativity*
- *Willing to initiate and participate in change*
- *Values truth, accuracy, honesty and ethical standards in personal and professional life*
- *Accepts responsibilities and obligations and asserts rights*
- *Appreciates his or her own and other cultures and customs*

The university obtained number one ranking in all three years of the DEET Quality Assurance rounds. McKinnon (the immediate past Vice Chancellor) is credited with transforming Wollongong into both a physically beautiful and technology smart campus. The university is currently finishing a $45 million building program including a central computer laboratories complex linking the Union Building, Library and multi-storey carpark, providing secure 7 day a week 24 hour access. The Library has received a 1996 Australian Quality Award for Achievement in Business Excellence, the first ever awarded to a library. All lecture theatres are equipped to full multimedia standard including Internet connection. All staff have networked desktop computers. All university information is available on WWW. All students can have a computer account for email and Internet access. There is dial-in access from Sydney for the cost of a local call. A central pool of laptops is available for loan to students and staff.

Part of the McKinnon commitment to IT for teaching and learning was the establishment in 1994 of a centralised Educational Media Services (EMS)

by:

- *combining some existing units (Interactive Multimedia and Videoconferencing, Printery, Audio Visual Service);*
- *establishing a Television Production and Text Production facility with PAGE funding;*
- *moving one educational consultant from the Centre for Staff Development; and*
- *funding a new position of Director.*

From 1996, EMS added educational consultants specifically responsible for flexible delivery into the Shoalhaven region plus a 'Competency Centre for Networking & Delivery', part of the STARLIT Cooperative Multimedia Centre. This amalgamated unit ensures a close coupling between educational consultancy and technical production when designing and developing high quality flexible learning environments with academic departments.

EMS reports to the PVC (Academic). Coordination between Information Technology Services, EMS and the Library is via the newly established ERPC: Educational Resources Policy Committee and its subcommittees (Teaching & Learning Facilities Subcommittee and Library Allocations Subcommittee). The ERPC will also provide advice to the University's Education Committee and Senate via the PVC (Academic).

Policy about teaching and learning at the University is created by the University Education Committee, a committee of Senate chaired by the PVC (Academic), with input from the Faculty Education Committees. Operations-wise, coordination between the units in Educational Services has not yet been fully achieved, other than via ASDAC, an advisory committee on staff development. Now that a number of Educational Services staff have been reclassified from general staff to academic status, they will become more actively involved in Faculty Education Committees, providing guidance about flexible learning at the decision-point rather than 'after the fact'.

Interventions to raise quality, such as those described above, are most effective when they are embedded in a theory of how students learn. Otherwise they may tend to cancel each other out rather than complement and reinforce each other. As another example of how to help to achieve this and guide choices, Deakin University publishes as part of their 1996 IT Strategic Plan an appendix, listing adult learning theories and practices that might inform university teaching and in particular any university teaching using information technologies. These are:

- the formal recognition of prior learning;
- a constructivist view of learning;
- autonomous learning;
- collaborative learning;

- the diversity of contexts of learning, including recognition that learning occurs outside formal tuition; and
- the changing role of the teacher from 'sage on the stage to guide on the side'.

Quality initiatives are also occurring in IT divisions in several universities. Some are also setting these in a wider framework and seeking and obtaining ISO 9000 quality certification in areas such as client support (e.g. Griffith and University of New South Wales). Some university IT units are also auditing their management processes for particular IT projects, and conducting post-implementation reviews to improve the quality of project management.

Certainly, most universities studied have significantly improved the quality and range of data available for decision taking and performance monitoring. The Academic Registrar at The University of Melbourne is typical when he notes that:

The new systems have been designed to provide management reports whereas previously they were just transactional records. To do this was a major task. It involved sitting down with Heads and Deans and working out with them what reports they wanted and providing them in a consistent way. Now there are substantial benefits in terms of monitoring of performance. The annual review round considers the data on the forty or fifty performance indicators collected by the systems.

Cost Reductions

Cost reductions, like quality improvements, can be achieved in a number of different ways. Dan Ellis, retired manager of Queensland University of Technology's Computer Based Education Unit and Australian pioneer in university teaching technologies, is well known for his DEET reports and conference papers quantifying the cost benefits of Computer Based Education (CBE) (Cochrane et al. 1993, especially Chapter 5). Implementing CBE in high enrolment subjects, using standard interfaces and interactions, delivering via a centrally supported computer laboratory in the library, were all techniques adopted at Queensland University of Technology to reduce the high up-front fixed costs of multimedia development leading to low average and very low marginal cost per student.

Outsourcing is increasingly used as a means of cost reduction. At Central Queensland University (CQU), all computers are leased providing fast turn-around in maintenance and regular turnover. The former reduces direct costs and the latter reduces indirect costs.

Some universities, such as University of New South Wales, are also either outsourcing a number of IT-based activities previously undertaken in-house, or closely examining the outsourcing options, in order to reduce costs. The University of Queensland's Prentice Centre uses a fee for service approach to keep costs in check.

The University of Technology, Sydney (UTS), is an inner city university; therefore, the costs are high for buildings and parking etc. IT is seen as part of the solution. Consideration of alternatives to travelling to meetings, such as audio-, video- and

computer-conferencing, will save time, parking spaces and travel expenses. In addition, in their strategic plan, *Fashioning our Future*, the University notes that it will become largely a paperless organisation. Authoritative information will be available on demand in electronic form from inside and outside the University. This will reduce expenditure on paper and photocopying.

Finally, many cost benefits are being realised from small scale reengineering projects. These improve the quality of the systems first and then efficiency gains follow; for example at The University of Melbourne:

We have taken $200,000 out of student admin. as a result of the implementation of the systems. That is about six jobs. All the exam results and graduation eligibility are now uploaded from the faculty. Much of it was done anyway at the faculty level and then recoded from their paper output. Eventually leave and casual payroll will be uploaded.

Similarly, Curtin University has reduced staff workload by enabling students to make their own address changes directly to the library's database.

Multiple Campuses

The increase in the scale of higher education as a combination of the previous government's push both to increase the proportion of school leavers who went to university, and to provide equal access to all students has in part been met by the creation of small campuses for small but growing populations in rural or semi-rural regions. This was often a political decision rather than one based on economic viability in the short term. In this context, management has looked to IT to aid equitable delivery and reduce costs of buildings and libraries.

CQU is trying to get full degrees operating in these campuses. Originally we thought we could use distance education materials for the first couple of years of the degree and then entice students to the main Rockhampton campus, but this was not successful. Delivering education through technology needs staff development and a cultural shift. So far there are only one or two curriculum units on line. We're now exploring the use of Internet technology.

(PVC Academic)

We are moving towards electronic campus libraries. It is 600 kilometres to the nearest library so electronic access is extremely important. The CQU Library is miles ahead of city libraries because city libraries are not driven by the same imperatives. The cost of packing of books and mailing out to students versus electronic delivery is obvious. We currently are running a trial on scanning and transmitting documents. Heavily used materials physically go into the regional campuses, but less used are transmitted electronically.

(CQU Librarian)

The difficulty in recruiting and retaining quality academic staff in the smaller regional sub-campuses also dictates that universities use communications and information technologies to support teaching at those locations.

Multiple campuses were also created by the mergers among existing institutions as the government's unitary policy was implemented. In a number of cases, very different institutions with very different histories and, therefore, different core competencies, joined together to award a single degree. This typically required upgrading the learning experience in some campuses to provide equality within degrees across campuses. For universities like Deakin, South Australia and Monash, this was one of the imperatives driving the strategic planning process.

Competition for Students

Organisations often compete by segmenting a market differently. In some cases, and, specifically, in the case of overseas students, government regulations segmented the market. Since the government allowed full fees to be charged, many universities have targetted the international students segment of the market. 'Full fee paying students are increasing rapidly, especially for overseas students (23 per cent growth), as is the export of education in general' (University of Technology, Sydney, Assistant Vice-Chancellor).

As the quote illustrates, education can be exported in two ways. One is for the students to come to Australia and collect the education. The other is by sending the education to the students in their own country. Two years ago, Central Queensland University (CQU) opened a campus in Sydney and now Melbourne, exclusively for their international students, to overcome the perceived disadvantage of attracting overseas students to a remote city like Rockhampton. This capitalised on its experience in establishing and managing regional campuses in central Queensland. This is an aggressive strategy which threatens the geographical quasi-monopoly of metropolitan competition described in Chapter 1. It is a strategy based on CQU's confidence in its marketing and management capabilities. It assumes that CQU can re-use its stock of distance education materials as resources in its face to face teaching in those international campuses. Increasingly it is envisaged that IT and telecommunications will underpin delivery at these remote locations.

Edith Cowan University provides a cogent example of how IT gives it a virtual campus presence anywhere. Edith Cowan University demonstrates how early identification of the advantage of IT is enabling the strategic implementation of plans to capture a larger share of the student market nationally and internationally (see Case Study 5).

If a university can manage a campus at arm's length in Australia, it can use the same capabilities to open similar campuses elsewhere in the world. Both Wollongong University and CQU have established campuses in Dubai in order that their international students have a choice of studying at an Australian university, either in their own country, in Australia or some combination. Others such as the Royal

Melbourne Institute of Technology have established campuses in Malaysia, often in collaboration with one or two other universities, Australian or local.

Case Study 5: Edith Cowan University, IT Strategic Planning and Implementation, 1995-1997

In 1995 Edith Cowan University prepared a three year plan to ensure that the University was able to provide many of its courses in modern flexible modes. The plan in brief involved the following aspects:

- *merging the Divisions of University Learning Systems and Media Services;*

- *further articulation with other related divisions;*

- *the relocation of University Learning Systems from Claremont Campus to either Churchlands or Joondalup Campus; and*

- *objectives, strategies and targets to promote resource based learning, flexible delivery and the effective use of technology in the teaching/learning process.*

One of the major objectives is to offer a range of delivery options to students on-campus, off-campus (interstate and overseas) and in particular, to provide leadership in the delivery of programs using electronic media.

Since 1995 the following structural changes have been undertaken.

- *University Learning Systems and Media Services have been merged. The major emphasis is on providing support and services to staff and students for resource based learning and flexible delivery options.*

- *Areas of the former Media Services Division involved in telecommunications (Media Engineering and ECUnet) have been transferred to the Division of Information Technology as part of the development of a communications infrastructure to support the delivery of data, voice and video in a consolidated and cost effective format.*

- *The divisions of University Learning Systems, Information Technology and the University Library have worked in close cooperation to develop appropriate systems and provide support infrastructure for students and staff.*

Substantial initiatives and developments have been made in the areas of videoconferencing, television broadcasting, networks such as the Virtual Campus and WWW, library services, multimedia development, and television

production.

Significant changes have been required to implement this move to a resource-based learning and flexible delivery structure. These include:

- *university policies regarding resource allocation, course validation and review assessment;*

- *staff development and training in using resource based materials and appropriate technologies;*

- *developing flexible learning periods including alternatives to fixed semesters;*

- *the development of 'facilitation units' to assist staff and students;*

- *research in the areas of the effectiveness of the new processes and materials developed; and*

- *changing attitudes towards partnerships with other providers and the necessity to buy and share developed materials.*

University Learning Systems has undertaken to provide and promote the design development and delivery of quality education to both on and off campus students utilising appropriate technologies to foster open and flexible learning.

Edith Cowan University is developing unit material and programs for electronic distribution. The establishment of intranets, the Virtual Campus and Webservers for the Internet has meant that many students, both on- and off-campus, are accessing learning materials and resource materials by electronic systems.

The two most recent projects for implementation in first semester 1997 are:

(i) a Multimodal Courseware Development System being undertaken by the School of Mathematics, Information Technology and Engineering; and

(ii) the development of electronic campuses at Midland Junction and Sydney.

Information Technology Support

- *City campuses have microwave links, buildings on each campus are linked with fibre optic cabling (enables full bandwidth TV replays) as the network backbone.*
- *Edith Cowan University provides students with access to some 660 personal computers, Intel and Macintosh, in 23 teaching laboratories*

> *and mega laboratories on all teaching campuses with up to 80 machines with 24 hours access 7 days a week.*
> - *Modem pools with some 150 modems in Perth and Bunbury provide dial-up service with IP access to the Internet and ECU Unix machines. The modems are 28.8Kbps. IP numbers are dynamically allocated.*
> - *ECUInfo is the central WWW server implemented on a Unix (AIX) server. It provides access to ECU information, links to faculty and divisional information servers and also acts as the gateway to the Internet.*
> - *The Virtual Campus network is a computer managed communications facility that gives students the electronic equivalent of on-campus services. Approximately 8,000 students and 700 staff have log-in access to Virtual Campus.*
>
> *Adapted from Knight, A. C. 1996, Edith Cowan University Learning Systems*

Assessment of the domestic Australian university system by IDP Education Australia is that it is unlikely to grow significantly over the next fifteen years. At the same time, Australia can expect to attract 5 per cent of the world's international students by the year 2000, and 7.5 per cent by the year 2010. In terms of universities alone, IDP estimate that at 5 per cent, Australia would have 89,000 international students in the year 2000, which would comprise 13 per cent of our university population. In 2010, at 7.5 per cent, 206,000 international students would represent 26 per cent of the university population. If this is the only major growth option for a number of universities, competition will be very strong. Those universities with experience in serving large numbers of overseas students are likely to have an edge.

Postgraduate Coursework Degrees

The application of full fees to postgraduate coursework degrees has focused attention on their marketability. This area is seeing considerable differentiation. Fees will accelerate this differentiation in terms of quality and innovation. Ability to charge high fees will tend to remain with the highest status universities who will then have the resources to reinvest in innovation and product improvement. Other universities will attempt to develop more standardised, lower cost postgraduate courses, which have reputations for reliability and ease of access, and are geared for a higher volume of students. IT can play an important role in both innovation and cost based strategies with regard to leveraging fee-paying postgraduate coursework degrees. Some universities are developing flexible modular programs linked to industry, which utilise IT as part of the delivery process.

The Student Base

Changes can be readily observed in the characteristics of the student base. Students are tending to be older, employed, more computer literate, and more demanding as they juggle work and family responsibilities with study to further their careers. More

flexibility means that increasingly, those previously denied access, including the disabled, will find university education more easily attainable.

Technology can give an opportunity to those not normally having access to university education.

(Griffith University's PVC Information Services).

Postgraduate and professional development offered by universities is increasingly offered to students in their homes and workplaces to reduce the opportunity cost of attending elsewhere. IT enables universities to strategically position themselves closer to their markets regardless of geography.

CQU knows that it has to cope, not just with campuses, but with homes and workplaces too. We are testing desktop videoconferencing in the IT Division. Modems are considered a black hole and outsourcing to ISPs is the way of the future. The previous Federal government used to say that we cannot mandate that all students have their own computer. CQU is doing a phased mandate because we can't spring it on the students all at once.

(Director, ITD)

UTS traditionally has strong links with industry. It has more [industry based] cooperative education and part time students than any other university in Australia (50 per cent vs national average of 29 per cent) so there is lots of travel for students that IT can help to reduce.

(Assistant Vice-Chancellor)

Libraries provide a good example of using IT to improve access. Most libraries have networked access to CD-ROM laboratories, databases and catalogues. Using the network to deliver access to electronic material, however, will be limited until the copyright issues are resolved. Libraries are also adopting strategies for managing the gradually increasing provision of journals in electronic form.

The major change in the student base emerges from the inevitability of lifelong learning. Continual change will require constant reskilling and updating, with several career changes predicted over one's lifetime.

Three Competitive Strategies

In Chapter 1, we discussed how the traditional university's competitive advantage was linked to its history, and based in the related factors of age, reputation and location. How those universities will compete in the future using IT is likely to be based on leveraging these embedded capabilities. For example, The University of Melbourne has built advantages over time based on such factors. It is now beginning to use IT to reinforce that advantage, in effect to produce a better version of itself. The focus will remain on attracting the best staff and students to the Melbourne campus. IT will add

value to the existing learning experience, and make it more attractive to the elite it seeks to attract. Other universities will do it differently, using their strategic application of IT to leverage their own particular capabilities. For example, we described in Chapter 1 how the University of New South Wales was a successful 'follower' to the early universities, and differentiated itself to become a leading university. One of its strengths is its powerful and innovative faculties. This is soon to be reinforced by the proposed restructuring into ten faculties. IT could be used strategically in that environment to create an infrastructure which further empowers those faculties.

Alternatively, some new universities are attempting to differentiate themselves from the modes of success in the traditional universities. In doing so they are seeking to find and serve market segments that are different from those where these older universities currently excel. They are the new followers who need to differentiate themselves from the existing players if they are to succeed. They will utilise IT to drive an efficient distribution network for well-structured and quality-controlled mass higher education, with the potential, for example, to capture a segment of the international undergraduate market. One way to win in this environment is to adopt a subsidiary strategy, essentially building a new operation to develop and offer the new IT-enabled degrees. As an example of this strategy, Edith Cowan University will use its Virtual Campus system to enter the Sydney market in 1997 (see Case Study 5).

Based on our analysis of the universities studied, we identify below three ways in which universities are competing, or in which they may compete in the future, using IT. Each strategic model is based on building competitive advantages based on the development of quite different core competencies.

- The first is a value-added strategy for the 'old' university. This is based on adding value by utilising IT in combination with high quality students and faculty. IT becomes an important part of a service-oriented, high cost, elitist degree offered by a high status university. Here, IT facilitates both on-line and on-campus interaction with students. In contrast with the low cost, volume based subsidiary model, it is a high cost and a high complexity environment, in which there is a variety of educational options - the ideal being the individually customised learning experience. It encourages unstructured exploration by a select group of students in conjunction with the faculty, rather than standardised and structured learning. In this model, administrative systems would be highly service-oriented, user-friendly and flexible. Thus location and experience of the on-campus community remain an essential part of the learning experience. The University of Melbourne is potentially an example of this strategic model.

- The second is a cost-based strategy for a 'new' university. This is based on the development of reliable, volume distribution of focused standardised education programs delivered through an IT-enabled network. Although there are initially high fixed costs associated with developing pedagogical materials, by reaching a mass market, average costs are low. This means that per student costs (and relative prices) can be kept low. Quality assurance around such a

strategy focuses upon its reliability and effective management of teaching and learning issues. Here, administrative systems are centralised, standardised and of low complexity. Advantage accrues to the provider who uses IT to deliver such courses in a convenient, and accessible form. The University of South Australia and Central Queensland University represent potential candidates for such a strategic model.

- The third, and currently the least developed strategy, is a hybrid which in a sense combines both strategies above to take advantage of the dynamics of mass customisation. This model uses IT to create a powerful, standardised infrastructure, upon which highly flexible, devolved educational programs can be developed and distributed. It seeks to obtain the benefits of both the lower costs associated with a central IT infrastructure (scale effects), while maintaining the innovation advantages associated with devolved academic divisions (value-added). The latter leverage their expertise in teaching and research to deliver a variety of quality educational options via the powerful shared IT platform. This model requires high levels of IT support both in the divisions and at the centre of the university. Administrative systems are both robust and devolved. While this option is currently undeveloped, an institution such as The University of New South Wales has the potential to build and leverage its IT infrastructure and its strong faculties to develop such a strategic option.

Those universities with the best versions of each of these three models will be successful and attract resources by competing differently. Whether and how they might compete globally is addressed in the final chapter. Of course, for a particular university, the question is whether it will be one of the winners and, perhaps more importantly, how can it be one of the winners.

Table 3: Three Competitive Strategies

Strategy	Organisational Form	Features
'Value-added'	Old university	Customised delivery High cost, high complexity Elite market
'Cost-based'	New university	Standardised, volume delivery Centralised, low complexity Mass market
'Hybrid'	Divisional university	Faculty-driven delivery Centralised and decentralised Mass customisation

As stated in Chapter 1, at least implicitly, this is not a level playing field. Different universities bring different assets and their related core competencies to the game. Melbourne, as our example of the 'old' university, is in a mature segment. The strategy literature would recommend that it redefines its scope in such a way as to leverage its

academic research reputation and location. That is exactly how it is attempting to utilise IT.

In contrast, for the University of New South Wales as the 'recent follower' in a maturing segment, the recommendation would be to raise barriers to entry of the market segment by aggressively driving down its experience curve-lowering its costs of production at the same time as it raises its quality. The barriers to entry are both the elapsed time and investment in assets, particularly human resources, which would be needed to match its performance in that segment. Finally, our 'new entrant' examples, the University of South Australia and Central Queensland University, compete with the prime mover trying to keep ahead of the field and the fast followers attempting to imitate at lower costs, perhaps, through joint ventures.

The major threat to The University of Melbourne and University of New South Wales is that they take their eye off the game and stop learning and/or lose control of their costs. The threat to the new entrants is that they pause or stop running and their competitors overtake them on the experience curve. Once left behind, it is hard to get back in contact with the leaders.

Impediments to Implementing IT Strategy

The interviews identified a number of impediments to the IT strategic planning necessary to implement the strategies described above. Here we consider the major impediments of cultural incompatibility and the two contributing factors of ownership of change and the rate of technical change. The basic issue is straightforward. If a factor or subset of factors in the MIT 90s framework are incompatible then the organisation would be in a state of poor or fragile fit and its performance would be put at risk.

Culture

As claimed at the beginning of this chapter, discovering a new strategy is challenging and creative. This is the design phase of strategic formulation which is followed by strategic planning and, finally, the implementation phase. In the MIT90s schema, strategic IT planning is the horizontal arm to the cross in Figure 4. When the organisation culture, the vertical post of the cross, is compatible with the implicit assumptions of IT strategic planning, there is high fit and few impediments to the realisation of the strategy.

Figure 4: Culture and IT Strategic Planning
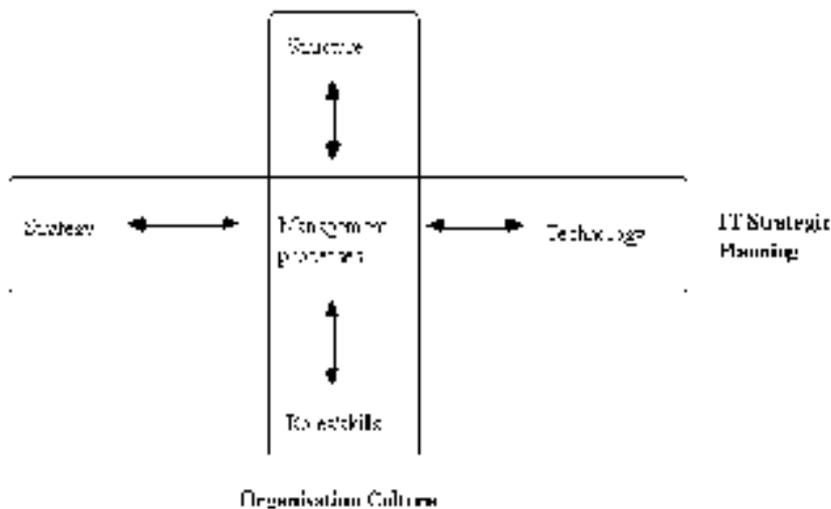
Unfortunately, existing university culture is frequently not supportive of IT strategic planning. So as the university implements its change, it shifts out of fit and performance drops off. It is as if it goes back up the experience curve rather than further on down. Unless it can bring its culture into fit quickly, then performance loss is likely to stall the change initiative.

Here we identify two such conflicts. First, universities, even the new ones, act as if they are part of a long tradition going back to the early universities of Europe. An example of this is the wearing of elaborate gowns for formal occasions. In this sense, universities are appropriately conservative. Who would choose a degree from an entrepreneurial and possibly short lived university over one from a university with a long and respected reputation? The student wants the value of his/her degree to be assured over a long period.

In contrast, IT strategic planning often advocates major change in the delivery or form of education. The guardians of a university's reputation may, and probably should, resist such changes until they are convinced that it is the way to go:

The conservatism of the Chancellor and some others is a barrier to change. They are concerned that the application of IT to education is taking away the human face.

(Site visit)

While such opposition can be frustrating, it is important to recognise that if the proposed changes fail, it could impose high costs from loss of reputation for all alumni of the university. It is also important to note that this conservative bias is evident even in a technology university like UTS which is favourably disposed towards a technology frame of reference:

Technology at UTS is not hard because many of aspects of the curriculum are considered technology, even a play is defined as a technology, but a balance is needed between enthusiasts who wish to explore new horizons, and those who are integrating

it into their current work. Most senior management see education as the focus not technology.

(Assistant Vice-Chancellor)

While support for technology based learning is given with one hand, it is qualified with the other.

Second, not everyone in a university shares the same culture (Taylor et al. 1996). This is true in particular for technology specialists and academics. The latter typically have long formal training, such as a PhD and, frequently, little experience outside higher education. In contrast, technology specialists often have less formal training, but not necessarily less training, and typically have experience in a number of different industries but may not understand the university's culture. In this sense, academics are locals whereas IT specialists are cosmopolitans. They have very different experiences and each often sees the other as uninformed.

There is a lot of time spent in educating the users who don't always know what they want. There is a lack of genuine IT knowledge therefore their vision is constrained.

(site visit)

Information Services is accused of being too technical and of not having enough pedagogy, especially from the Faculties. This is a meaningless split between academic and general staff. Who says we are to be the services, and academics are to be the driver?

(site visit)

A culture change of the scale represented by the adoption of IT mediated learning would take a minimum of three to five years to become embedded in a university (Hesketh et al. 1996). It requires the development of new skills and roles as we see in the next chapter. It also requires that new structures are designed to integrate the technical and the academic staff. This itself would be a major change.

Ownership of Change

The recognition that structure is one of the factors which inhibits the evolution of new culture supportive of IT based change is reflected in the restructures and amalgamations currently underway in many of the universities. Should IT report to Administration or to a PVC (Academic) along with other teaching and learning units? Is the head of Flexible Learning at the same level as the head of IT? Should training about teaching and learning technologies be in the academic professional development unit or in Information Services? Should the professional development unit be in a faculty or in central administration?

The debate is not only reflected in the operational structures but also reflected in the policy committees established to plan for IT. Is it a computer policy committee run by

IT staff? Should there be an overarching committee run by the end-users such as library and teaching? Are faculty representatives on the committee technical general staff or teaching academic staff? For example, at Central Queensland University it has been recognised that IT is fragmented so a new Vice-Chancellor's IT Policy Committee has been formed. Previously the IT Committee had been seen to be taken over by 'techno heads'. It has now been restructured so that it becomes a policy committee to work on the new Strategic Plan. They are working on persuading Deans to come back on the committee along with the Directors of the relevant divisions.

Recall, the universities selected for case studies were ones that were well known for their emphasis on information technology and for their documented IT strategic plans. In many cases, however, their strategic plans are from the early 1990's and have not been revised since. The process which appeared to be relatively straightforward then is now stalled as the end-users try to come to an understanding of what they want and what form their relationship to IT should take. What appears to be happening is that these universities are first reassessing their structures, both operational and policy, before undertaking the IT strategic planning process again. The intention is to make the Plan driven more by end-users. Originally IT policies were driven naturally enough by Information Technology units and were strongly focused on centralised infrastructure. More recently, IT policies have been driven by the end-user-libraries, administration, teaching, and research-and are more needs-driven. The Australian National University, for example, has strong faculty-based user IT committees which feed their priorities into the IT decision making process.

All universities interviewed have IT Strategic Plans written in the past six years. All have separate current Library Strategic Plans which address IT issues along with other Library issues. Libraries, as early adopters of IT, have in general had separate IT policies for some time. Few universities have separate IT strategic plans for research or for administration as this is mainly addressed within the overall IT strategic plans. Some have recently developed strategic plans for teaching and learning which incorporate major discussion of IT.

Indeed, teaching and learning is claimed to be the main driver at all universities in 1996 and this is reflected in the changing make-up of the policy committees at each university. The University of Technology, Sydney and Wollongong have both recently set up new policy committees. Wollongong's Computer Policy Committee has been replaced by an Educational Resources Policy Committee which has as sub-committees a Teaching Facilities Committee and the Library Committee. At the University of Technology, Sydney the committee is called the Teaching and Learning Resource Committee. At both universities, these committees will be chaired by the Deputy Vice-Chancellor or Pro Vice-Chancellor Academic.

The University of Technology, Sydney committee's terms of reference are to prepare and maintain a strategic plan for the coordinated teaching and learning activities at the University, and to liaise with the Library Users Committee, the ITS Users Forum, and other user groups as necessary in order to advise on ways of developing infrastructure and capabilities to facilitate flexible patterns of teaching and learning which take advantage of emerging information technologies.

We can contrast these latest moves with the first initiatives in this area. When The University of Melbourne first established its Interactive Multimedia Learning Unit in 1991, it also established an IMLU Advisory Committee which reported to ITPAC, the IT Policy Advisory Committee. Although IMLU was strategically placed in the Centre for the Study of Higher Education (CSHE) to signal to the academic community that multimedia was about teaching and learning rather than about technology, the formal policy input to management was only able to be made via a technology committee. The IMLU Strategic Plan (1992) was a subset of the IT Strategic Plan as there was no Teaching and Learning Strategic Plan. Subsequently IMLU amalgamated with Audio Visual Services in CSHE and became the Multimedia Education Unit (MEU) and has recently been taken out of CSHE to report directly to the Deputy Vice-Chancellor (Academic) and will be responsible for staff development as well as production in multimedia. Correspondingly the policy committees are changing to reflect that. There is a new Committee of the Academic Board, the Teaching & Learning (Multimedia & Educational Technology) Committee, which has the responsibility of approving funding for large and medium-sized projects. The Multimedia Education Unit provides regular reports and advice to that Committee which comprises the Director of MEU together with two of the Deputy Vice-Chancellors and the Academic Board officers and two multimedia-literate individuals and educationalists. The Director still also sits on ITPAC and reports regularly there.

This early dominance by or reliance on a technology-led policy agenda was typical in the United Kingdom as well. Early reports from the Computing in Teaching Initiative Projects in the UK:

…can be conveniently labelled a 'technicist' perspective, under which the challenges facing those seeking to integrate computers into the curriculum are viewed as intimate to the technology itself... Of the first 81 positions filled under the scheme, no less than 49 went to individuals whose primary academic or professional qualification was in computer science or a cognate discipline (such as information systems engineering). It is even more remarkable that 19 of these computing specialists were recruited to projects which did not seek to generate new programs of any kind, but rather to exploit the capabilities of existing subject-specific software for highly discipline related purposes.

(Gardner and Darby 1990)

The shift now across all the universities studied is towards more input by the users.

In addition to the shift in influence at a policy level towards the user, there is a shift in understanding that to consult more widely is good process. In the past, IT strategic plans were written by one or two people with some input from advisory committees. Nowadays there is an attempt to consult more widely and to view the strategic plan as a process.

The University of Technology, Sydney IT strategic planning process is a good example. The corporate policy is developed starting at the top. Every year there is a retreat where the corporate priorities are set; for example, the critical issues in 1995

were research, quality assurance, internationalisation and interactive multimedia. Then faculties develop rolling triennium plans. They build a performance profile against objectives and go on faculty retreats, do SWOT analyses, and develop action plans. It then reverts to top-down for development of the final Corporate Plan.

In addition to this normal process, a long term vision statement has been completed, titled *2015*. This was a process for the whole university. Peter Ellyard was used as an external facilitator on futures thinking. Twenty four hour access to learning and electronic delivery figures highly in the preferred vision accompanied by a corresponding reduction in face to face teaching.

A similar future looking document was produced at the University of Technology, Sydney for IT called *Fashioning Our Future*. The final document is split into a number of sections titled:

- enriching the educational process-an IT vision for learning and teaching;
- stimulating our creativity-an IT vision for research and scholarship;
- enhancing our community presence-an IT vision for outreach and community service;
- unlocking our resources-an IT vision for management of resources; and
- crafting new communities through communication-revolutionising our creation and sharing of information.

The development of user-influenced, if not user-driven, policy committees and processes such as the one just described, have collected a lot of information, informed a lot of people and generally raised the salience of the issues. They have been less successful in identifying and initiating action to achieve IT-based strategic change. In that sense they inform and coordinate but, not surprisingly, these committees do not make it happen. The split in ownership between the academics and the specialist general staff is still very visible and a major impediment to implementing strategic IT-based change.

Rate of Technology Change

The different knowledge bases of the typical academic and the IT specialist lie at the centre of the cultural impediments to IT strategic planning described in the previous two sections. The question is will this gap close? The simple answer is no.

This is obvious from a short inspection of the Australian Vice-Chancellors' Committee issues paper on 'Exploiting information technology in higher education' (1996). For example, under Predictions for 1999, it reports:

Midrange machines will be largely convergent UNIX based, and all standard ranges will incorporate multiple parallel processors. However, these machines will be challenged to some extent by single-function server machines designed to deliver UNIX-like functions to the PC environment.

Much of this is difficult to interpret for the typical academic! If such knowledge is necessary to make the investment decisions and/or to design new IT based learning experiences, the academic would need to understand this now. This does not mean that the academic has to be a technical expert but needs to understand the implications of the technical capabilities available. For the redesign of a subject, let alone a degree, the university lead time is such that 1999 is today. When the same report talks about technology past 2000, which is the time frame for strategic change, it notes that this is speculative and should be regarded with caution. It is easy to sympathise with the interviewee who said:

There are no internationally accepted standards for electronic information and there are endless new search engines on the Internet so you have to keep learning new skills. The ground rules are constantly changing and you have to keep up to date.

(Central Queensland University Librarian)

and the academic who commented with feeling that:

The early adopters who innovate become disheartened when the tool that they have painstakingly developed, is made redundant by the release of something bigger and better at half the cost by a multinational corporation. Early academic adopters can rarely sustain the energy and commitment of resources to stay at the forefront.

If it is true as one interviewee concluded that 'people don't know what's possible, that there is is an inability to discuss horizons for technological change-where in three years, where in 5 years?', then is IT strategic planning not simply impeded but structurally defective? The answer is naturally both yes and no. Yes—IT strategic planning cannot on its own resolve the impediments that are discussed above. No—as Gardner and Darby say well and our interviews confirm:

CTI (Computers in Teaching Initiative) projects have discovered that educational computing is more than just a technical obstacle course, and more, indeed, than a mere educational challenge. It is primarily a social process of technological change within an organisation. It is replete with all the ingredients that mediate for or against such change in any organisation: the control of, and access to, resources; the behaviour and attitudes of the actors; and the institutional structures and conventions within which the change is being promoted or resisted...[In] the words of one CTI project director, 'although the goals, packages, and data of computer based teaching are increasingly discussed, the strategic decisions and organisational approaches which allow these objectives and tools to be translated into pedagogical reality tend to be taken for granted.

(Gardner & Darby 1990, p. 31)

In which case, the solution lies in making these 'strategic decisions and organisational approaches' tractable. This, as we will see in Chapter 6, is what the models of strategic change identified in Chapter 1 can do to effectively implement the three strategies described earlier in this chapter. What is important to recognise here is that both the

opportunity and the problems or impediments are issues of management and leadership and not technology. In general, the latter is accessible to all and, therefore, cannot of itself be the basis of competitive advantage.

Consider the development of a 'subsidiary' within an existing university to deliver IT based education to a specific market segment. First, the limited objectives require an IT strategic plan which is far less complex than for a full service university. Second, given both the limited objectives and the new startup organisation of the subsidiary, the necessary expertise can be recruited, internally or externally to the parent university. This would include the skills and processes to manage multifunctional teams. Third, relatively well defined performance indices can be defined. Then with feedback on performance against goals, the subsidiary can learn and improve its performance. The final step in the argument is that to be successful a university does not have to do everything best. Rather it needs to do most things well and one or two things, which are the basis of its sustainable competitive advantage, better than its competitors. If the subsidiary is set up to learn these one or two things, then the university has the basis for developing a competitive advantage.

Collaboration

The above analysis of strategy is predicated on the assumption, central to the strategy literature, that competition leads to differentiation. Central to the value system of many Australian academics is that they are members of an academic community. Collaboration is a core characteristic of any community, and a particularly strong one for the academic research community. So, an important question is, how does collaboration fit into strategy? Certainly, the study revealed extensive collaboration. Much of it is associated with attempts to reduce costs for individual institutions, and this is reinforced by government grants which require collaboration in the development and utilisation of expensive technologies, especially those required for research infrastructure. In fact, a number of the collaborative initiatives underway are the product of government investment.

Libraries have a good track record of collaboration - essential in an operating environment where decreased budgets call for more bargaining power. For example, the Council of Australian University Librarians (CAUL) negotiated better deals for database access through the collaboration of its members. Cooperation among libraries is already evidenced by the rationalisation of collections (in Asian History, for example) and the interlibrary loan system, which reduces the need for each library to maintain a totally comprehensive collection. IT allows both easier exchange of information, and specialisation.

There are some areas in which the economies of scale can only be realised across universities. These are natural areas for collaboration. However, even in these areas, the joint investment decision is very hard to make. Sometimes, one institution leads by making the initial investment. The question then is how it gets value for that investment.

For example, Griffith University and Wollongong University both reported that collaboration in flexible learning is critical because they are small and new to the field. Open Learning Australia (OLA) works well for Griffith-they report that they wouldn't have got a national market without OLA. It has not been profitable yet but they are very interested in the overseas markets that OLA can get them. Griffith's involvement in the OLA consortium gave momentum to review their IT strategy. Open Learning Australia is perceived by Central Queensland University to have been an expensive collaboration and they would now like to get more out of it:

It is important as a concept but, as with all consortiums, it has got to work for each of the members.

(site visit)

There are also collaborations in the course materials development area. Griffith Flexible Learning Services is looking at adapting existing materials for Open Learning Australia from the Annenberg CPB Projects in the United States and the United Kingdom Open University. Both PAGE and OLA not only encourage and facilitate collaborative courseware delivery but also courseware development. Macquarie University and Auckland University, for example, are jointly developing postgraduate resources on the environment.

The University of Technology, Sydney reported that collaboration has not been important yet on the education side but it will be needed if UTS is to do distance education.

People don't want it as it creates problems but in economic terms UTS will need it. Now modular courses are needed and collaboration in development and delivery of these will be required, especially electronic delivery. Collaboration on credit transfer is important too. OLA is seen as too general for UTS. PAGE as post graduate and professional distance education may be more relevant to UTS.

(site visit)

This illustrates not only the pressures for collaboration but also the difficulties of managing the collaboration venture for all partners.

One way of solving the difficulties associated with joint investment decisions is for the government to provide direct incentive and direction for the adoption of information technology. The Cooperative Multimedia Centre (CMC) program, a federal government multimedia initiative, aims to bring together the educational, technical, artistic and commercial communities to help meet the needs of the multimedia industry. In addition, the business partners provide a key part of the management of the joint venture. Most universities interviewed reported that it was too early to tell yet whether the CMC initiative will be successful with regard to both maintaining the collaboration between universities and industry and achieving the stated outcomes within the time frame.

By far the most important collaboration is with the national administrative computing initiative, CASMAC. It is recognised that there are overheads in collaboration but that there are important potential benefits. The University of Technology, Sydney reports that CASMAC is still a bit difficult:

As they change one part of the whole system, the whole system needs to change, for example we have introduced part time summer school and this impacts on the implementation of CASMAC which was designed a couple of years ago without foreseeing these changes.

(site visit)

We discuss the CASMAC initiative further in Chapter 4.

The above are essentially cost-sharing collaborations in areas in which the parent universities do not compete or in which the initial investment is either too large or too risky for one of the partners to go it alone. The other form of collaboration is among a group of universities such as the 'group of eight'. Here the intent is to segment the market in such a way as to benefit the 'group of eight' relative to other universities. Naturally, the excluded universities object. However, *a priori* it is unclear whether this benefits or costs the community as a whole. Certainly, as the areas in which government policy encourages competition increase, we would expect to see the number and range of such joint ventures increase. Against this in the short run, the governance structures for joint ventures are not well-developed in universities.

The above examples show that there are a number of collaborative initiatives underway at the universities we studied. In general, the interviewees were positive about their potential. But there are no compelling examples which were judged by their participants to have been major strategic successes. Is this because they have been in the wrong areas, not been managed well or have the expected benefits from collaboration, at least in strategic terms, been set too high?

National Initiatives

Institutional level planning must take account of federal government initiatives and vice versa. In Australia, federal government strategies for supporting and fostering the adoption of new learning technologies span a wide range of policies. These include the Committee for University Teaching Staff Development (CUTSD) and its initiatives such as Teaching Grants and Clearinghouses. Don Anderson, the founding chair of CUTSD, predicts that academics will increasingly be asked to devote more time to teaching and developing computer based learning:

For the majority of the 800-year history of the modern university it is only in the past 50 that research has become so dominant. There is just no way that governments, who are the chief patrons of universities, will continue funding on the assumption that academics will devote one third of their time on average to research, for their professional life-times-that is a wrong expectation. The professions and the community want good teaching before research.

(The Australian, 18 September 1994, p.18)

The Australian CUTSD initiatives have some similarity to the United Kingdom's Computers in Teaching Initiative (CTI) and Teaching & Learning Technologies Program (TLTP). A review of IT teaching infrastructure in the United Kingdom for the Universities Funding Council (UFC) concludes that national infrastructure is very important to the long-term viability of adopting flexible learning in a university:

The information and dissemination role of the CTI Centres is only a small part of the infrastructure network needed, however. The high cost of courseware development, the need for technical and administrative support, and the continued predominance of face-to-face teaching are all barriers to the use of CBL. The potential educational and efficiency benefits cannot be achieved unless an appropriate organisational structure is in place... The piecemeal approach of funding individual projects has served its purpose. Nothing new can be achieved by funding short-term and fragmented initiatives. Educational technology methods presuppose a system-wide approach to the development and provision of teaching and that is where funding should be directed.

(Universities Funding Council 1992, p.9)

A comparison can be made between the increasing differentiation identified in Australia and the above call for a government controlled infrastructure program. It is certain that such a program would reduce the differentiation and, hence, lessen the level of competition. It is our judgment that this reduction in competition would impede the development of new core competencies and reduce the long term value added of the higher education sector.

Indeed, the Australian initiatives in this area tend to support specific strategies rather than impose a blanket infrastructure for all. This includes the Open Learning Initiative (OLI); Open Learning Australia (OLA); OpenNet; the Open Learning Technology Corporation (OLTC); Professional and Graduate Education Consortium (PAGE); Education Network Australia (EdNA); and the six Cooperative Multimedia Centres (CMCs).

Conclusion

Increasingly, Australian universities see each other as competitors. As theories of competitive strategy predict, we therefore observe increasing differentiation across universities. This is illustrated above in their image management. These examples also show how IT has become a major factor contributing to this differentiation. Five factors—increased quality, lower costs, distribution and campus size, competition for students and changing student profiles—are major drivers of the increased differentiation, while a sixth factor—inter-university collaboration—tends to reduce it.

Of course, if all universities had responded to these drivers in the same way, differentiation would not have increased. However, as discussed in Chapter 1, a

university's competitive advantage is linked to its history and, in particular, to its age, reputation and location. Differences in these 'initial conditions' across universities have resulted in their adoption of different strategic options and, hence, the increased differentiation.

Three strategic orientations or ideal types are identified. These represent very different ways of competing in response to these drivers. While it is not claimed that these are the only effective ways to compete-indeed others are expected to be developed in a competitive environment-they do capture the key current strategies that we observed. First, there is the traditional university. It will offer an elite education experience characterised by high cost and high complexity within which the range of educational options available for the student are maximised. This will be supported by a user friendly, flexible and service focused administration. Second, there are new universities following cost based strategies. These are developing learning rather than teaching orientated programs to be delivered in an 'anywhere, any time' style. These typically have high set up costs (fixed costs) but low running costs (variable costs). The goal therefore is to go for scale-number of students enrolled. Here administrative systems will be centralised, standardised and of low complexity. Finally, there is a third option which is emerging rather than is well developed. This combines both the above strategies to take advantage of the dynamics of mass customisation. This model uses IT to create a powerful, standardised infrastructure, upon which highly flexible programs can be developed and distributed by powerful semi-autonomous faculties within a university. Administrative systems will be robust with operations devolved and development centralised.

In our discussion of these three ways of competing, we link strategy and technology. In the following three chapters, we deal with the relationship of technology to each of the other three elements of the MIT90s framework: roles/skills, management processes and structure. Together, the latter three form what is called organisational culture. In a sense, organisational culture sits between an IT strategy and its successful implementation. A university develops a new IT-based strategic vision, but its culture may prevent its successful realisation in practice. New cultures are extremely difficult to build, and we discuss above how culture is often an impediment to IT-based strategic change, particularly when issues of ownership of the change are problematic, and this is reinforced by high rates of technical change.

Finally, not all areas of a university's performance are subject to competitive pressures leading towards higher differentiation. In some areas there are forces promoting collaboration. In the case of libraries, we observed a number of cooperative initiatives to both reduce costs and raise service quality. In addition, national initiatives which treat all universities the same tend to reduce, or at least are neutral towards, differentiation. But the key finding is one of increased differentiation across universities as they compete differently to service their students' needs.