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**The Influence of End-Users on Strategic Information
Systems Planning in a NZ Polytechnic:
A case study**

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ABSTRACT

This study reports research about the management of information technology and the experience of computer users at the Eastern Institute of Technology, Hawke's Bay in New Zealand. The context of the study is New Zealand tertiary institutional use and professional practice of information technology management in the early 2000's. It reports and analyses planning meetings of the information technology department and user groups and activities related to the information technology strategic planning process in the years 2001/2002. The investigation of the relationship between the desires and expectations of user groups and the influence these have on the setting of strategic information technology plans is the object of the study.

Literature describing other organisations' approach to strategic information technology planning is reviewed in terms of its relevance to the study. In addition selected literature about end-user computing and the approach to information systems planning from the viewpoint of the user is presented. From this literature emerged some patterns of information technology management, which included user group participation and a modern approach to strategic planning using emerging technologies at tertiary institutes.

A justification for the selection of the particular research approach is explained and data collection, organisation and analysis are described. The study uses Eastern Institute of Technology corporate records, meetings minutes, interviews with managers and users, and results from staff and student surveys on information technology planning. This is a case study which examines and analyses the complex dimensions of organisational change and planning, so is rich in detail and provides a "slice-of-life" example of a tertiary organisation grappling with the many demands of information technology and user demands

The results of the data analysis are presented in terms of the key plans and aims of the information technology department and user groups. From this analysis conclusions are drawn in relation to the research questions that underpin the study and in terms of

information technology and management planning methodologies. In particular, conclusions draw a relationship between the quality of information technology strategic planning and the level of consultation and involvement of computer users at various levels within the organisation; key organisational processes helping to allow user involvement and the articulation of a shared vision through published information technology planning documents.

The conclusions also view the information technology planning process as a move towards a learning organisation with the characteristics of the context of change and new technology.

Flowing from the research findings, recommendations are made for professional information technology management practice and for changes in non-IT managers' involvement in the information technology planning process.

CHAPTER 1

INTRODUCTION AND OVERVIEW

This chapter presents the background, context and setting for the study, outlines the purpose and describes the significance of the study. The chapter also presents the research questions to be addressed, overviews the research design and limitations of the study and overviews the organisation of the thesis.

BACKGROUND AND CONTEXT OF THE STUDY

The Eastern Institute of Technology (EIT) is a medium sized polytechnic offering vocational national certificate/diploma qualifications as well as a growing number of degree programs. Currently there are a number of different information systems on the EIT campus with a local area network connecting approximately 700 PC's.

EIT is located in Hawke's Bay, an area with a population of 100,000 on the east coast of the North Island of New Zealand. EIT has a student equivalency of approximately 3000 (2001), with a full-time staff of 260.

Faculties at EIT include:

- Business and Computing
- Maori Studies
- Arts and Social Sciences
- Science and Technology
- Health and Sports Science.

Other key non-teaching sections include the Education Services section and the Computer Services section.

As stated in the 2001 annual report, EIT aims to be the pre-eminent provider of tertiary education in Hawke's Bay and the eastern region of the North Island, New Zealand. In fulfilling this role it aims to enhance the capacity of individuals to participate in the workforce, enhance the capacity of its communities to manage their own development, and enhance the capacity of businesses to use knowledge, expertise and technologies.

As Frenzel (1998) describes, information technology (IT) has risen in importance to all organisations and this is now reflected in the increased importance of the role of IT management. Commonly now, the IT manager (or Chief Information Officer (CIO), Information Systems (IS) Manager) participates within senior management and may even co-lead the organisation with the CEO. The management of information technology spreads wider than simply the operational management of the IT department itself and affects other functional areas throughout a company. IT has become critical to the successful of most organisations including tertiary institutes.

Hussain and Hussain (1997) support the view that end-user computing (EUC) has grown within organisations and now has more power to influence IT management decision making. As a research and teaching organisation, groups of users at EIT with specific IT needs are becoming more aware of the importance of IT-led initiatives.

PURPOSE OF THE STUDY

The Eastern Institute of Technology (EIT) has been chosen as the organisation under study and provides a good representative sample of a medium sized tertiary organisation in New Zealand. EIT has grown rapidly in recent years and is in the process of a new information systems strategic planning cycle. The aim of this study is to relate end-user computing views and goals to the development of a strategic IS plan and to find out which areas of end-user computing are most readily applied in this strategic planning. This should also address the question of whether EUC can have a greater influence on IS planning at EIT and what level exists currently.

Initially, the thesis will outline the overall current situation of information systems at EIT and identify potential strategic development areas. A recent SISP (Strategic Information Systems Plan) will be examined and some recommendations for future development of strategic information systems are proposed.

SIGNIFICANCE OF THE STUDY

This study forms a case study in two senses; one, in that the case is a unit under study i.e. an EIT case study. But also uses the case study research methodology to examine a holistic view of an organisation and to tie together two threads of IT. These two threads are IT strategic management and end-user computing. The study is unique to EIT, in that it provides an overview of an entire IT planning cycle from several viewpoints and reveals some attitudes, motivations and real world complexities of spheres of influence in the EIT community.

The study is also significant as a peculiar comparison between two distinct sub-fields within information systems. These two fields; EUC and IT management are often studied and researched but not often side by side.

RESEARCH QUESTIONS

The following questions have been specifically framed to help gain insight into how successful utilisation of end-user computing can be facilitated in the strategic planning of information technology at EIT. Therefore, within EIT:

- What areas of end-user computing can be applied to the information systems planning process?
- What areas of strategic information systems planning could be more influenced by end user computing concepts for a better outcome for tertiary institutes?
- Could end user computing have a greater influence at the Eastern Institute of Technology?
- What models of management, information systems or end-user computing can be used to effectively explain current and future systems at EIT?
- What are some of the political relationships and processes that lead to an EIT Strategic Information Systems Plan?

RESEARCH DESIGN AND LIMITATIONS

Case studies, especially qualitative case studies, are prevalent throughout the field of information systems and tertiary education and have been used to help illustrate IT management practice in organisations successfully. By using the case study methodology a richer level of investigation can occur, with multi-layered levels of information.

However, the case may reveal more information than can be dealt with in clarity and conciseness. As the researcher works as an IT lecturer at the site under study, there may be less objectivity than an outsider. However, the advantage of an ethnographical approach is the ability to “read” political situations, unspoken signals and underlying motivations of the players involved.

ORGANISATION OF THE THESIS

The thesis is organised into six chapters including this first chapter backgrounding the study.

Chapter 2 reviews a range of information technology management literature about the strategic management approaches to the governance of IT, as well as literature about the development of end-user computing. Literature was also reviewed on specific examples of IT strategic planning and governance at other tertiary educational organisations.

Chapter 3 presents the methodology used in the study, including reasons for using the case study approach. A description is given on how the data was collected and analysed.

Chapter 4 presents a detailed background of the IT governance at EIT, and discusses many historic issues relating to information technology at the institute.

Chapter 5 presents the results of the EIT case. It presents a description of events in connection to the IT planning cycle at EIT. The chapter also makes an initial presentation of the staff survey results and a number of interviews with key players in the user community and in the managerial ranks. Chapter 5 also presents the analysis of findings in relation to the research questions in chapter 1.

Chapter 6 presents recommendations for general management at EIT, IT management at EIT, for IT management in the tertiary sector generally, and for further research.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

TYPES OF SUPPORTING LITERATURE

This literature review forms the foundation for the Eastern Institute of Technology (EIT) case study, and consists of three streams of supporting papers. One body of knowledge stems from strategic information systems planning (SISP) including some management methodologies and practice. The second stream of literature involves end-user computing (EUC) and the approaches to information systems from the viewpoint of end user communities and computing. Lastly, this literature review will evaluate and discuss previous case studies or information technology planning processes that have already been undertaken within tertiary education organisations.

Throughout this literature review, the terms “information systems” (IS) and “information technology” (IT) are used interchangeably as many of the supporting papers and research discuss IT strategic planning in a similar context to IS strategic planning.

DEFINING STRATEGIC INFORMATION SYSTEMS PLANNING

In examining the literature on SISP, there are a number of different definitions.

Gottschalk espouses the application portfolio type definition: “SISP is the process of identifying a portfolio of computer-based applications that will assist an organisation in executing its business plans and realising its business goals.” (Gottschalk, 1997).

In comparison, Wilson (1989) describes the function of a IS strategy as follows:

“An information systems strategy brings together the business aims of the company, an understanding of the information needed to support those aims, and the implementation of computer systems to provide that information. It is a plan for the development of systems toward some future vision of the role of information systems in the organisation.”

Another definition of IS strategy states “An IS strategy is something which is essentially a planning process in the minds of the decision-makers, users and developers of the systems. It is supported with written reports and plans, but they are of secondary importance” (Reponen 1993).

INFORMATION TECHNOLOGY MANAGEMENT ISSUES

Clarke (1994) describes strategic information systems as systems whose importance reaches beyond assisting IT to perform its existing functions efficiently, or even just effectively. Clarke concludes that IT strategic planning can and should have opportunity to drive corporate planning at the highest levels, and IT can actively assist in the creation of business opportunities, rather than just support them. Traditional business literature often contains the implicit assumption that business needs drive IT and information strategy.

“Information systems executives are particularly challenged because they operate at the intersection between information technology and their organisation” (Niederman, Brancheau and Wetherbe 1990).

As discussed by Niederman, Brancheau and Wetherbe (1990), IS managers and those responsible for IS planning must be able to interpret trends in information technology and assess current and future impacts on their organisation. In the process, they must constantly allocate their scarce time and resources among competing demands. There are other issues facing IT management currently, including making effective use of the data resource as information is now viewed as an essential factor of production. As end-user computing continues to grow, managing the data resource becomes more complex. In a poll of IS executives, Niederman et al found that IT infrastructure, utilising the data resource, strategic planning and end-user computing issues were a high priority.

Although end-user computing tends to be rated lower as an issue among IS managers, Niederman et al suggests this is because EUC has penetrated so deeply into most organisations it can no longer be managed by the IS function. Current IT management issues can be divided into four main groups; business relationship, technology infrastructure, internal effectiveness and technology application. These four issues will be important in this EIT case study.

Niederman et al (1990) identify several top issues facing users and IT managers. These include information architecture, data resource, strategic planning, and IS human resources. There is a need for consensus amongst IS planners and users including senior management, otherwise the traditional divide and antagonism between user groups and the IT function may remain. Although end-user computing is often ranked lower amongst recent literature than a decade ago, this may be due to a maturation of IS in organisations and organisational learning as EUC is taken for granted and incorporated in organisational structure.

Badawy (1998) outlines the viewpoint that responsibility for the strategic direction of IT management and the fostering of end-user computing should come from senior management generally and is not the exclusive domain of the IT management group. Badawy addresses this issue when he states: "Top management must accept its primary role in technological innovation since the process of managing technology begins at the top. Technology direction must emanate from senior management, which defines business strategy, allocates investments funds, and establishes corporate policy. If this is not done these tasks default to others at lower organisational levels."

Cooper, Watson, Wixom and Goodhue (2000) point out that although much of the IS management literature exhorts IS professionals to align IS with business goals, "business leaders may be in a far better position to bridge the gap between technology and the business than IT leaders. If business leaders understand the possible contribution of IT, and if they have a vision of the future that requires IT to support it, they will find a way to put that IT in place, regardless of the capabilities of their current IT group" (Cooper et al 2000). These "business leaders" may actually be considered as senior level end-users as well as co-architects of strategic IT systems.

Frenzel (1999) discusses the many reasons why senior managers and IT managers focus their attention on the long-range strategic implications of IT and concentrate on achieving competitive advantage with their IT investments. Developing such a strategy requires an understanding of the organisation's mission and goals, and an understanding of the environment the company is operating in and how the company's business units interact. In most organisations, strategy development and planning is a critical success factor for IT management; this includes business aspects, technical issues, organisational concerns, financial constraints and personnel.

It appears from Frenzel that cooperation is needed between the IT department and all other sections of the organisation and if this is done effectively the IT strategy should unify and integrate other functional area's strategies.

The oversight role in the strategic management of IT may consist of representatives from senior and middle management, user representatives, IT staff and the IT manager.

"Since corporate managers are also users of information systems, representatives from the top echelons of the firm participate in the development activities of many projects. Managers, for example, as future systems users, will participate in feasibility studies and help draw up system specifications when new applications are initiated" (Hussain and Hussain 1997).

Hussain and Hussain describe the role of the IT manager, who often walks the line between allowing creative expression by user groups and the need for overall control of organisational processes at the same time. The management, and the setting of the strategic direction for information technology in an organisation involve a web of relationships between corporate management, end-users, and IT personnel. End-users are found at all levels from senior managers through knowledge workers to general office workers. The steering committees and the IT management need methods to determine if end-user needs are being met and planned for. Senior non-IT managers perform two roles as participating end-users; firstly as managerial advisors and visionaries who will "use" strategic systems, secondly as potential hands-on end-users of concrete IT systems which may be a part of the strategic systems co-built with the IT department.

“The strategic importance of a firm’s IT capabilities is prompting an increasing number of companies to appoint chief information officers (CIOs) to effectively manage these assets. Such moves are reflective of changes in top management thinking and policy regarding the role of IT and firms’ approaches to IT governance” (Chatterjee 2001). More chief executive officers (CEOs) and senior management have confidence today in a senior CIO’s ability to translate the organisation’s strategic business direction into corporate information systems that will support that direction. Chatterjee (2001) outlines this senior-level ability as a facilitator-participant, setting out a vision of IT-based strategic initiatives. Also the ability as the architect-leader of an effective IT management capability is in demand by organisations struggling with the strategic positioning of the IS management function.

Many organisations struggle with inadequate IT systems due to IT management being represented too low in the organisational management structure. This often means that IT management signals are filtered through another layer of management before senior management attends to them. This may be due to historical reasons or because IT as a field is not fully understood or not trusted as a strategic system initiator. Foster and Hollowell (1999) confirm the need for IT leadership to be represented at the highest level of management structure. Increasingly this is done in universities by consolidating academic and administrative computing, telecommunications and multimedia under one functional area. It is interesting to note that tertiary organisations often managed two separate IT systems; academic and administrative, until recently. This divide is seen as less necessary with security measures able to handle the unique position of universities and polytechnics having customers on their premises using their computer equipment.

The IS senior management must do more than efficiently manage the current set of IT resources: “The academic leader must articulate the degree of transformation expected in the university’s basic mission and the role that modern telecommunications and information technologies should play in that transformation” (Kobulnicky, 1999).

This shows that the leadership required is more than being able to operationally control the IT function but rather be politically and strategically aware of the major issues facing the organisation. This will require a great deal of internal environmental scanning including consultation of users at all levels throughout the organisation.

Day and Schoemaker (2000) list four main criteria for deploying emerging technologies successfully for strategic use by organisations:

1. attending to signals from the periphery
2. building a learning capacity,
3. maintain flexibility by adopting an options perspective, and
4. maintaining organisational separation.

The first solution of “attending to signals” acknowledges that emerging technologies signal their arrival with weak signals years before they become employable or commercially viable. This means managers of IT need to look ahead to anticipate the possibilities and define which IT technologies are strategically significant. An example of this is the recognition of universities to use integrated learning systems delivered on the Internet and how to use this emerging technology for strategic positioning.

How should a tertiary organisation use the web technologies? To deliver academic programmes off-campus, or to supplement current internal courses? This is the type of issue where senior managers, users and the IT section must listen to the weak signals today and decide how to position their organisation.

The second criterion outlined by Day and Schoemaker involves building a learning capacity within the organisation by cultivating openness to a diversity of viewpoints within and across organisational units. This learning capacity includes “a willingness to challenge deep-seated assumptions of entrenched mental models while facilitating the forgetting of outmoded approaches, and allowing continuous experimentation in a climate that encourages and rewards well-intentioned failure” (Day et al 2000). This would seem to be natural for universities and technology institutes but pragmatism and modern management techniques applied to the academic function often suppresses this creativity.

The third criterion for utilising emerging IT technologies is to balance commitment and options. “It takes all the energy of an organisation to pursue one clear and strategic aim and that hedging, by exploring a number of alternative directions, is expensive and dilutes commitment” (Day and Schoemaker 2000).

The last success factor for strategic use of technology is to separate the existing organisation from the new initiative. The culture, mind-set, risk-avoidance tendencies, and controls of an existing organisation are usually stifling to a new initiative based on an emerging technology. This is why large companies are counselled to set up separate organisations dedicated to pursuing a new endeavour. Tertiary educational organisations such as the Eastern Institute of Technology are likely to be transformed by emerging technologies such as Internet-delivered knowledge, E-Learning and information technology infrastructure facilities.

Evaluation of the outcomes of strategic investment decisions where these were heavily influenced by IT finds that these investment decisions are often performing below initial expectations because of the “inadequacy of the organisation to control such large and technically complex operations” (Tzu-Chuan, Dyson and Powell, 1998). Other factors that show the strategic nature of IT include: the decision process needing duration, involvement of decision-makers, interaction with users and employees, and awareness of

the influence of major stakeholders and strategic information. This would support the premise that IT strategic planning should involve end-users as widely as possible. This paper supports the view that the higher the level of the IT department input, and the lower the user input into the strategic planning and decision-making then the greater the risk of large project failure.

Some of the barriers to strategic information systems planning and implementation include a lack of management commitment and support, lack of resources, and a low level of user involvement in implementation. These barriers are discussed by Gottschalk (1997) and he recommends identifying and using “champions” outside the IT department to support strategic IS planning. The IT department cannot successfully plan and implement projects without the ongoing support of user managers and user IT experts. There is less of a sharp divide today between the IT/IS department experts and the business users as many users can be close to the level of technical expertise of the IT people.

Studies of organisations to find out if they had actually implemented their strategic IT plans found that few had actually implemented their plan as set out in the formal plans. The greater the extent of user involvement in planning and implementation, then the more successful the implementation of the IT project, as outlined by Gottschalk (1999).

“Technology planning is not solely about developing a plan for managing and using centrally-purchased technologies. Much of the responsibility for technology planning lies outside the central technology department. The strategic framework, for example, must be developed, funded, and monitored in collaboration with the leadership of mission-critical academic and administrative units. Even the IT architecture and the shared, centrally managed technologies must have the confidence of, therefore input from, the independent technology support organisations which span a range of mission-critical units, such as the libraries, the schools and colleges in a large institution, and various administrative offices” (Graves 1998).

Top management must ensure user input at senior levels throughout an organisation and not simply rely on a sole IT director to perform the environmental scanning and forecasting for all the different areas needing IT strategic planning. It is probably not within the scope of an IT manager to make professional educational decisions for future teaching delivery.

Successful IT strategic planning for any organisation includes having a long-term strategic framework for prioritising and funding those uses of technology which are most strategic to the institution's mission. Good future-proofing also requires a continually changing, standards-based implementation of infrastructure and technologies to guide the buying of IT and the provision of technology services at all levels in the organisation. Successful IT planning also needs a collaborative process for making sure that IT architecture and investments support the institution's strategy.

Some SISP problems would include: too vague a vision, lack of institutional vision, lack of situational analysis, and too long a time to create systems. There can be plenty of IT plans but often users of technology are not listening anymore – they are too busy planning their own vision and plans for IT. (Moran, 1998)

Critical success factors for successful strategic IT planning with user groups include executive support, leadership, funding and communications management.

“The strategic alignment framework provides us with an approach for ensuring that both the long term and short term needs of our campus community are identified, prioritised, and addressed. By working across the campus we can develop a clear picture of the future, the present, and the roadmap in between” (Moran, 1998).

Enns, Huff and Golden (2001) in their report on how CIO's obtain peer commitment to strategic proposals, discussed the result of a multiple case study of several organisations. This case study tried to find out how CIO's or IS managers secured support amongst peers and user levels for IS proposals. Focused interviews and large-scale surveys were done to ascertain lower and middle management support and CEO support.

They found that the organisations with the most successful IS proposals and projects sought close alignment of business goals and information systems aims. IS proposals performed better with much consultation between non-IS managers and IS management. Enns et al stated that "initiatives must be consistent with the overall strategic direction of the organisation" and that "leverage of existing, well-established relationships" was very successful in positively received systems. Another less successful political technique observed was some level of ingratiation between user managers wanting IS project approval and the IS "gate-keepers" to these future systems. However they warned also that IS managers should "recognise that initial commitments may wane". Overall they concluded that "CIOs today are involved in shaping and supporting business strategy" in order to tie together successfully strategic IS direction and the various end-user communities.

END-USER COMPUTING

Hussain and Hussain (1997) discuss the recognition of the end-user stemming from the rise of the PC workstation, associated software and distributed processing within modern organisations. The end-user has become more computer-literate, more willing to participate in computer processing and more able to manage computer resources themselves. There has been a transfer of responsibility from the computer professional to the end-user and a “release from the tyranny of the computer kingdom which has resulted in many delays in the development of systems” (Hussain and Hussain 1997). While this language may be strong, Bjerknes and Bratteteig (1995) also point out that modern knowledge workers have a low tolerance for strongly authoritarian IT departments making all decisions regarding computing.

Nambisan, Agarwal and Tanniru (1999), while looking at organisational mechanisms for enhancing user innovation in IT, explore the creative input that users can have on strategic IT proposals. This view of user’s input sees users as more than passive recipients of IT systems but rather as partners in future strategic IS planning. Nambisan et al believe that because the nature of IT has changed and widened in scope, and because users have a greater technology cognisance than ever, users can greatly influence IT planning.

Other reasons for this greater influence include the fact that users have a greater ability to explore new systems and technology. Trust and a positive environment must exist between IT staff and users for a good generation of new ideas for IT proposals. For example the Help Desk need not be just a place to log and deal with problems but the Help Desk itself may suggest ideas for users exploring technology thus generating ideas for IT innovation and future strategy.

This viewpoint from Nambisan et al raises an interesting angle on user involvement beyond simply being involved in planning and implementation of systems. This raises

the issue of where does an organisation allow experimentation with new technology tools and software? Is this only the domain of the IT department? It would seem that users and user groups today have the skills and the need to try out new software, systems and new digital/hardware products in order to help make recommendations for application within the organisation.

Strategic IS planning relies on informal contacts and a knowledge of the internal politics operating inside any organisation. Segars and Grover (1998) in their research on successful outcomes in SISP, discuss the role of an “organisational informant” in a positive sense. The organisational informant is at all levels, both inside and outside the IS department, and is necessary for the development of “informed” IT plans. They may not be directly involved in traditional systems analysis and design, but give insight into the user view, the political currents, and the unofficial acceptability of future systems. However these informants, generally amongst the user communities, may have a lack of knowledge and also may have vested interests in proposed IS plans, so sampling of informants must be examined carefully.

Looking at the influence that successfully implemented end-user information systems may have on allowing more user input into the planning process, Regan and O'Connor (2001) see end-user systems fitting inside the overall framework of the information systems strategic plan to avoid piece-meal development of applications for the organisation. “An effective information systems strategic plan (ISSP) directly supports the business plan and establishes the enterprise systems architecture within which end-user information systems (EUIS) are planned and implemented” (Regan and O'Connor, 2001).

Many enterprises are struggling to find more effective ways to organise the IS function, including the need to connect between the business goals and the technology aims. There is also a potential divide between the end-user vision for the use of IT and the managerial aims for IS. Consultants who are business specialists and technology generalists provide the interface for linking business strategy and information technologies. This attempts to

address the problem of the alignment of IT and business, and indirectly addresses the problem of alignment of traditional IT planners and the end-user groups.

Regan and O'Connor (2001) make the note that this presumes that users themselves understand the business and the business strategies. If users are not well aligned with business strategy, information systems can only help them go the wrong way faster. Strategic planning for end-user information systems is usually a responsibility of upper-level managers.

Information systems which effectively are aligned with business goals and end-user requirements must forecast business needs, the broader business environment, the pace of organisational change, staff support requirements, and investment strategies. End user information systems planning can easily become left as an after-thought at the end of larger scale information systems and often exposes a need for more integration of various separate systems.

“The ability of most businesses to assimilate and apply EUIS lags far behind the opportunities – a strategic void that can be critical. Senior executives often believe that they should receive more benefit from technology investment, but few are able to articulate how these benefits should be achieved” (Regan and O'Connor, 2001).

After consultation and ensuring that alignment of IT and business is addressed, the strategic plan for technology should form the basis for determining which applications should be addressed in what order. The strategic plan should support business goals as defined in the corporate strategic plan, should respond to management concerns and changing business requirements, and coordinate with overall information systems.

When establishing where end-users and communities sit within a modern organisation it is helpful to appreciate the traditional user support that evolved through the 1980's. Computer users were discovered as a vital power group outside the computer centre

control and have since then matured in political power. An information centre is that part of the IT department focused on supporting the user with such services as a Help-Desk. Guimaraes, Gupta and Rainer (1999) discuss current issues regarding the support and success of end-user systems and communities. Users cannot be left entirely to their own development and systems but still require business support, including understanding user business problems, improving communications, providing a good atmosphere for users and improving liaisons with user departments.

End-user communication can be helped with newsletters and short presentations on tools and software and also with steering committees to provide a forum for IT staff and users. Another aspect which can help end-user IT outcomes is to clarify the roles of both the support staff and resources and the roles of the end-user communities. This allows management to step back from the traditional control and management of IT.

This paper also confirms that as EUC has grown that additional resources are still needed to provide the background support and infrastructure such as an Information Centre. This research by Guimaraes et al show that the stronger the Information Centre to support the end-user communities the less EUC problems occurred and the more confident end-users were of developing systems of their own.

“As end-user computing becomes pervasive in most organisations, its diversity grows along different dimensions, one of which is the type of end users. The categories of end users differ in the types of applications they use, their levels of computer literacy and computer skills, and their need for support. Contrary to early expectations, end users do not become independent. Rather, as their sophistication increases, they increasingly demand better equipment, more training, coaching, consulting and technical support” Guimaraes et al (1999). These findings may have an impact on the influence end users may have on the IT planning of systems in organisations, as users are likely to demand increasing resources as they become more sophisticated in their use of systems.

Management concerns that Guimaraes et al pointed out in their study of 185 organisations included the fact that many end users are non-technical, therefore exposing the organisation to risks such as incorrect system models, inappropriate data, lack of documentation, and threats to data integrity and security.

Other risks include lack of user training, lack of security, and lack of systems backup. Organisational and senior management may increase their support to the information centre concept, which is an important part of the success of EUC. The lack of organisational support is seen as a critical barrier to the effective utilisation of personal computers and a large part of EUC is carried out by knowledge workers and junior managers, so senior managers who are often older may not provide the necessary strategic direction and resources to properly support end-user computing.

End-user groups need the flexibility and power to initiate and develop IS projects themselves, as long as these projects fit into the overall IS strategy and framework and do not develop into “islands of IT” (Regan and O’Connor, 2001).

This further develops the idea of some “middle ground” between end users and senior IT planners when dealing with the development of organisational information systems through the perspective of end-users and end-user stakeholder groups. This viewpoint contrasts with some conventional “top-down” IT management approaches to IS development and frameworks.

The reasons for successful adoption and support of IT systems by end-users are discussed fully by Agarwal and Karahannal (2000). They conclude “the importance of eschewing a strictly utilitarian perspective on the usage of information technologies. As technology developments continue to focus on richer and more appealing interfaces, the importance of experiences that are intrinsically motivating, i.e. pleasurable and enjoyable in and of themselves, might dominate as predictors of usage intentions. Managers desirous of successfully implementing new IT need to be cognisant of this relationship and strive to create an organisational environment that not only encourages experimentation and

exploration with new technologies, but also offers opportunities for cognitive absorption” (Agarwal and Karahannal, 2000).

Brooke and Mills (1998) outline a generic strategic planning process as starting with the vision, listening to the customer, listening to internal staff and users, and checking the competition. Then this process attempts to interpret the environment, adjusting to match the environment, and finally arriving at the strategic plan. This model would fit well with the approach of full consultation with users leading to an IT strategic plan.

One of the issues within organisations is the degree of control of the IT department and the rights and autonomy of the user community. This balance of power must be addressed before users can credibly be part of the IS strategy formation.

A “bill of rights” can establish the user needs formally for the computer user within an organisation because of a perceived lack of consideration given to the use of proposed IT systems by the user (Karat, 1998). These rights would include the premise that the user is always right, to be in control of the system, to be able to uninstall and re-install software easily and the rights to a system that performs exactly as promised.

Another important “right” that has an impact on this study is “the user has a right to communicate with the technology provider and receive a thoughtful and helpful response when raising concerns” (Karat, 1998). This concept would also apply to an internal provider.

Another industry commentator, Liebmann (1998), has discussed the idea of treating internal IT users as customers in order to overcome traditional criticism of IT departments as being unresponsive. However there are areas where this analogy breaks down, for instance an abusive or irrational customer can be dropped as a customer whereas an internal user cannot really be declined service altogether. The other question is: How can SLA’s (Service Level Agreements) be enforced anyway? To dismiss the IT Manager or remove parts of their salary package? Liebmann also suggests that in order

for quality IT planning and development to occur business and business users need to change and become more responsive to the evolving needs of their increasingly important technologists. This article puts an ongoing responsibility on the users to acknowledge the ever increasing presence and need for IT and that users cannot absolve themselves of IT responsibility because they have been consulted once during the IT planning process.

The standing of the information centre will have an influence on how successful IT planning will be in conjunction with end-users. Brancheau (1988) rated 53 Computer Services Centres (Information Centres) in corporations throughout the United States and found five main characteristics of the top rated organisations. These were:

1. Support the core services
2. Define and communicate the mission
3. Lead in the use of Technology
4. Develop a competent and friendly staff
5. Emphasise service.

Brancheau asserts that there needs to be some slack to promote the growth of end-user computing coupled with moderate control necessary to protect the organisation from risks in such activity. This moderate line balanced between allowing healthy end-user self-determination and an overall IT control will have a major impact on the success of strategic IT planning performed with end-user computing fully considered.

There appear to be trends in opposing directions – both end-user dispersed computing and more centralised control. Networks are moving towards large server / thin client configuration, heralding a trend back towards some centralisation by having more administration control at the server end. However, users are more computer educated and proficient with greater expectations of personalising their work via systems and greater expectations of being consulted and being a part of the planning process of IT planning.

Senior management may have more desire today for “mainframe-type” central control over all PC users as they see the rapidly expanding costs of many PC workstations throughout their organisations. Some IT managers may resist too much consultation of the end-user groups as end-user reputation is not always appreciated in IT management circles.

As Dodson (1995) points out “end-user development efforts typically adhere to no standards at all. Usually, departments have their own staff develop these applications, or they hire outside consultants to build applications for them.” Where end-users have got their own way in the past, it has meant the organisation has had to put up with “Islands of IT” with various small systems incompatible with each other. This kind of reputation with the management of IT, does not typically endear end-user influence to those primarily responsible for the IT management process.

Because knowledge workers probably have less tolerance of overly controlled working environments, including the computing environment, there is a general expectation to have a democratic involvement in decision-making about IT (Bjerknes and Bratteteig, 1995). Modern workplaces expect user-centred involvement and a workplace democracy demands user involvement. The socio-technical approach in these Scandinavian studies by Bjerknes and Bratteteig advocates allowing the users perspective and input into IT planning rather than allowing exclusive planning and control by the IT management players.

There is evidence of resistance by IT departments to allowing more end-user power and influence. McBride and Wood-Harper (2001) comment that “the moving of responsibility, resources and authority from IT departments to user departments is frequently seen as a loss of power by the IT departments and an erosion of cost control by senior management.”

Other reasons why the IT department may avoid allowing end-users more input into the planning process include the presence of conflict between IT and end-users, and EUC

being seen as uncontrollable. This IT-centred view of end-user influence sees end-user influence as a problem to be solved through the application of tight standards, auditing and financial controls.

Allowing more EUC influence through the opening up of management input channels may be seen as a dangerous phenomenon. However this is probably a narrower viewpoint from more traditional IT departments and means that the organisation may miss out on the advantages of end-user involvement in IT. Some of these advantages would include increased creativity to IT systems, the extension of organisational knowledge, and greater opportunity to create good solutions based on local knowledge and common experience.

In the past IT departments have seen the growth of EUC as a problem, but increasingly IT is empowering the user community as it is discovered that many tasks can be “outsourced” to the user community rather than kept by the central IT department.

McBride and Wood-Harper outline a useful table comparing the IT view with the user view of the use of formal methodologies (which tend to exclude the user from the strategic planning process) in end-user computing.

IT View	User View
Reduces duplication	Removes my autonomy and ownership of the data.
Reduces difficulty of maintenance	Removes dependency on me as the system expert, reduces the extent to which I am needed to understand the problem and my creative solution to it.
Improves quality	Reduces creative input, reduces my ability to develop an evolving solution which reflects who I am (my role in the organisation) and my ability to develop my skills
Improves security	Reduces accessibility of system, reduces my ability to gain kudos by spreading my clever ideas around the department.
Improves backup and recovery	Increases time wasted on non-essential, technical activities which I don't want to worry about because they are not part of the problem I am working on.
Aligns IT department and EUC	Allows IT to interfere with the way I work, increases IT's power and control which I am trying to break free of, reduces my independence

Table 1. Contrast between IT's view and the user's view of the use of methodologies in EUC

This table takes into account both viewpoints of how more formal information systems can affect themselves and the organisation.

From the literature reviewed on end-user computing and technical trends there appear to be several different influences on the way end-user computing is organised. There is no single clear preferred mode of operation for IT departments and the end-user groups. Some trends (technical and management) point towards a subtle centralisation of IT control to the IT department, while other trends (social and PC-literacy) point towards an increasing expectation of end user self-determination. End-user computing, both generally and specifically, has an influence on user input during the strategic IT planning process.

IT PLANNING FOR TERTIARY ORGANISATIONS

The tertiary education sector shares many similar issues with regard to IT and user demand which affects strategic planning and user input. Roche (1997), when writing about managing and using information resources on college and university campuses, regularly raises issues on IT management for educational institutes.

These tertiary IT issues include retaining skilled IT support staff when industry often offers more reward than publicly funded universities through to determining access rights for an itinerant set of customers (students). Other issues which are quite unique to tertiary organisations include student expectations for technology support and services, distributed learning (Internet), intellectual properties on a digital networked environment, managing IT and user expectations, levels of support and information access challenges on the networked campus.

These studies of parallel cases of tertiary educational organisations help establish issues, questions and problems of IT planning and user satisfaction peculiar to organisations similar in nature to the Eastern Institute of Technology, which is under study.

This literature review looks at how a number of different tertiary organisations currently form strategic IT plans. Allen (1995) outlines approaches that Sheffield University took to form strategic IS planning in conjunction with users. This study analysed the groups or coalitions who participated in the formulation of the strategy within the institution.

This analysis acknowledges the weakness of strategies that are solely lead by the managers of computer centres, remaining marginal to the concerns of the majority in the institute. If the planning is largely lead by the IT management then the final strategy is likely to be weak and not reflective of the business strategies of the organisation.

McCredie's IST report (1999) for Berkeley University outlines their main IT strategies as providing IT leadership, to build the IT infrastructure and expand IT technical support.

These strategies have emerged in part as a response to the challenges of fixed budgets for faculties, expanded integration of IT into teaching and learning, emerging electronic storage for all forms of knowledge and a matrix of divided responsibilities between user groups and the centralised Computer Services.

McCredie (1999) goes on to list other challenges for tertiary organisations including having budgets fixed while IT demand is exploding. Another challenge unique to the tertiary environment is that campus responsibilities for educational technology and academic computing are not clear; is it the academic departments cost and responsibility? Or is it the IT department's responsibility to provide an entire IT teaching platform?

Added to this is the traditional divide between academic IT systems and organisational systems. There may be suspicion amongst academic staff that the IT department, because it reports to an administrative management hierarchy, has a closer obligation to administration systems than to academic teaching systems. Tertiary academic IT management needs to provide IT leadership, build the IT infrastructure, and expand IT technical support, while leading and facilitating any strategic planning initiatives.

Rosenfeld (1998) asserts that "technical colleges in the United Kingdom are emerging as critical factors and key institutions in technology based development to fill industry's requirements for more highly skilled and technically proficient workers" (Rosenfeld, 1998).

Recent reforms coupled with the delivering of degree level qualifications means that New Zealand polytechnics are adding more rigour to technical criteria, are articulated with higher education but still based on the realities of industry. This positioning in the education and training sector means that polytechnics must model implementation of strategic use of IT coupled with high levels of end-user involvement and skill levels themselves in order to prove themselves technologically advanced to surrounding industry and customers.

Rosenfeld cautions technical colleges such as EIT that “if the upgrade (move to higher degrees) shifts emphasis away from technicians, where demand is high, and away from local industry problems to higher level, more publishable research, the regional economy may suffer” (Rosenfeld, 1998). Rosenfeld highlights how important it is for Polytechnics or technical colleges to embrace IT themselves plan IT as part of their regional strategy, and model usage of IT with end-user computing to the region in which they reside.

Oblinger and Rush (1998) confirm the challenges facing technical colleges by asking: “how do you create the future compatible campus? The current higher education environment is increasingly complex. Shifts in the workplace are driving changes in higher education. Technology trends are affecting individuals, institutions, and societies. In general, information technology places pressure on the “middle-man”. Computer networks offer the possibility of “disintermediating” both learning and student services. Demographics are shifting; students are behaving more like consumers. Public confidence in higher education is at an all-time low” (Oblinger and Rush, 1998).

There is an increasing importance for organisations to have in place a strong IT infrastructure in place, both technically and managerially, before planning and implementing IS changes (Broadbent, Weill and St.Clair, 1999). This infrastructure would include the following list:

- Reliable services and electronic connectivity within and outside the company
- Manage firm-wide communication network services
- Manage firm-wide messaging services
- Recommended standards for hardware and IT architecture
- Provide technology advice and support services
- Manage large-scale DP facilities
- Ability to enforce IT architecture and standards
- Executive Information Systems
- Electronic linkages to suppliers or customers

If companies have achieved success in reaching and maintaining systems to this level then further IT strategic planning is likely to be more successful (Broadbent et al, 1999).

When users rank IT areas of importance then alignment (alignment of business to technology) and general IT service was rated higher amongst users than long-term strategic issues. Often “softer” issues are more important to users than perfecting technical requirements (Worrall, Remenyi and Money, 2000).

Integration of IT planning into organisational needs and inclusive IT governance are two important recommendations for effective strategic IT planning, particularly for tertiary organisations. “Effective IT planning cannot take place in a vacuum. It must be integrated into institutional planning, mission, and goals. Faculty, department heads, deans and other administrators need to understand and embrace the role of information technologies in achieving their institution’s mission and goals” (Foster and Hollowell, 1999).

More effective IT planning is possible when an organisation encourages consultation throughout the organisation. Tertiary educational organisations can establish committees with representation from teaching, research and administrative sections to include the user view and the stakeholder view in all IT strategic planning. Research departments or personnel should have input into IT strategic planning both as users of data (data warehousing for research functions) and as strategic thinkers outside the main business function of a tertiary educational institution.

The results of several studies which assessed the usefulness of campus networks found that evaluation of IT is seldom done, and that it is hard to quantify how much was spent to achieve a certain level of IT infrastructure (Lippincott, 1999). As IT planning and spending is dispersed amongst user groups it becomes harder to quantify the total IT spending. This in turn could cause some reluctance of senior managers to approve too much user involvement in strategic planning of IT.

As Taylor and Eustis (1999) write “In an era of constrained resources and vastly increased demand for services, the performance of college and university information technology organisations has been questioned relentlessly by faculty, students and administrators” (Taylor et al, 1999).

Another issue for IT strategic planning peculiar to tertiary institutions that involves academic end-users is knowledge management. Knowledge management is particularly relevant for tertiary institutions as an important issue is where the scholarly record is kept. Generally, the scholarly record is kept in an assortment of documents, creative works etc. The administrative information architecture is generally set up as a separate IT architecture. It can be helpful to look at information as separate from IT, and allow user input into this “information architecture” (Bernbom, 1999).

Kobulnicky (1999) argues that information technology planning at institutions of higher education should be derived from academic planning at the institution, school, and department levels and must respond to the associated issues of leadership, sustainable funding, productivity, and faculty motivation.

Fundamental to this analysis (a study of an academic IT planning process at the University of Connecticut) is the concept that an increased adoption of information technology is a strategy towards a larger institutional vision and not an objective by itself.

IT is a top concern at tertiary institutions because of increasing demand and awareness that IT strategy will be necessary to carry modern organisations into a successful future. Task forces can be set up to address different parts of the strategic IT planning where different users are involved, for example a good vision statement should include:

- IT integrated into daily life
- Enhances productivity
- Promotes learning
- Exploration
- Continual renewal

“Institutions of higher education are in an era in which their strength in human resources and associated intellectual capital must be leveraged as much as possible. Leadership in higher education must set focused strategic directions for their institutions and set expectations for the level of IT investment institution-wide. IT leadership must provide a new level of assistance to academic leaders on evaluating the potential for IT to improve the competitiveness of its schools, departments, and the individual students, faculty and staff” (Kobulnicky 1999).

Often a technical college or Polytechnic pitches itself as a technological leader and provider of quality technical education and yet does not see its own IT strategic plans as part of this identity. Many universities’ strategic plans provide no sense of the level of technological investment expected, yet university leaders promote the future of the university as a technological leader in their region. (Kobulnicky, 1999).

Hackney, Kawalek and Dhillon (1998) argue that the strategic IT planning process “tends to utilise approaches that support the envisionment of an organisation strategy but without encouraging the complementary contribution of enabling key information and technology users to share the planned vision, or to play a key part in its formulation.”

It is often surmised that the reason for the rise of end-user computing is because of the intransigence of the central IS or IT department therefore EUC needs to be considered early in any strategic planning cycles. There have been attempts to use non-technical analytical methodologies such as soft systems methodology or socio-technical systems to provide end-users major input into early planning stages of IT. Using these “soft” methodologies for the users shields users from needing technical interpretation skills such as the ability to use CASE tools or development tools.

Learning for users tends to still focus on technology skills based rather than on information or management understanding (e.g. IT management models) which would help more in users being able to usefully participate in the IT planning process.

Stewart (1996) discusses user partnership with IT professionals from the viewpoint of how to be a better business user providing good business information for IT. This approach comes some way to up-skilling end-users on documentation, overall business planning and the strategic value of any proposed systems. This also implies that the reason for traditional dissatisfaction with IT delivery is not purely the fault of the IT department but may also be a result of organisations not recognising or valuing end-user information for any IT leverage. The end-user must take responsibility for IT planning and implementation all the way through the process and cannot simply “play dumb” and leave it all to the IT personnel. End-users need to educate themselves so they can enter intelligent informed dialogue with IT leaders and so be partners in the IT strategic planning process.

Those Polytechnics that have added IT services to students that allow at least some off-campus learning hold a competitive advantage. Therefore the SISF of any Polytechnic should focus on students first as customers (Beede and Burnett, 1998).

Common themes for the student centred approach include:

- Information infrastructure
- Direct information access
- Integration of student process and data
- Cross-functional teams
- Student Centred
- Any time, any place – especially access to course knowledge

An example of this kind of strategic planning involving facility management, student groups and academic staff can be seen in Project Agora at Boston College (Beede and Burnett, 1998). The aim of the Agora project was to create an electronic community for students to gather together based in the residential halls.

The service included a directly wired access to email, voice, video and interactive cable TV (51 channel). Students can plug their PC, phone or TV into the connection box next to their beds and join in discussions, lectures and multimedia material. It also allows access to the entire internal campus network learning facilities and servers. This kind of facility generates enthusiasm amongst students even for mundane services such as telephone access. This kind of strategically planned system is only possible to envisage and plan with input from facilities management, faculty staff, students, IT management and senior executives. It is unlikely to arise from the singular planning from the IT department management.

Many private high schools are encouraging students to purchase Notebook computers and allow access to their IT network. Universities and Polytechnics are likely to follow as some researchers feel that tertiary institutions will need to give up the industrial age model of providing PC's in laboratories and classrooms and move to the expectation that every student will arrive at university or polytechnic with their own PC or notebook (Oblinger et al, 1998).

This kind of strategic planning is only possible when senior management and other user groups get together with IT management and map out the future possibilities of the institute. Mobile computing is also likely to be provided as a response to student demand and expectations, already lecturers at polytechnics in NZ report a number of students at lectures and labs with their own notebook computers.

Oblinger et al observe “as educational paradigms change from teacher-centred to learner-centred, technology serves as a catalyst for the development of learner-centred approaches to education. Technology can expand opportunities for faculty and students to extend or transform the traditional classroom experience” (Oblinger et al, 1998).

At Wake Forest University the decision to implement compulsory PC purchases by all enrolled students was a result of a faculty-student strategic planning group. This puts some responsibility for the workstation environment from the IT department to the student (user) themselves although the university still provides a sophisticated network structure (Brown, 1998).

The benefits include personal and individual autonomy, technological transformation, the fostering of nomadic learners, flexible access to information, and the ability to provide a level playing field.

End User Computing (EUC) can be defined as the optional development of computer applications and models outside the official IT department. However end users themselves may be involved in the planning of IT even though they may not be engaged in fully fledged EUC. Six main categories to judge general IS success can be held as system quality, information quality, system use, user satisfaction, individual impact and organisational impact (Shayo, Guthrie and Igbaria, 1999).

However success factors for EUC driven IT projects may also include “user information satisfaction” (UIS) which covers a wider concept than simply user satisfaction. User satisfaction can narrowly be interpreted as a user groups’ satisfaction with the

performance of an application for them. Whereas UIS covers the users (which may include managers and stakeholders at various levels) satisfaction with the systems in general, including concepts as alignment, strategic success and success of business aims. Users are often not included in the judgement of the success of larger IS implementations but seen as simply a direct hands-on computer user.

There are a growing number of examples of a wide range of stake-holders, users, managers and even students/customers all participating in IT management planning. As Kahler (2000) documented, more than 100 faculty, staff, and students worked together at Indiana University to develop a strategic plan for information technology at Indiana. These future plans included advanced networking and convergence, and wireless networks with an emphasis on allowing user input on how to introduce the new technologies.

Augustine, Oliphant and Amiri (2000) discusses how planning in any area of higher education involves complex interactions among the mission of the university, the needs of its constituents, budgetary constraints, and – most importantly – visions.

Within information technology, planning is a particularly complex endeavour due to the constant evolution of computers and networks and their influence on our communication, research, and education.

“To make technology leadership decisions informed decisions, the university must involve all of its stakeholders in the decision making process” (Augustine et al, 2000).

Randall also confirms this need for universities to plan for changing needs; “In the face of rapidly changing technology and dynamically increasing computer hardware and software needs, universities need to formally address how they will meet demands in the near and distant future” (Randall, 1998).

Giuliani (1996) advocates using a team approach to managing IT and creating strategic IT plans as one way of ensuring constant user participation in the planning process. This team approach can even replace the role of a top IT manager and can ensure representation from students, faculty, administrators and support staff. This team approach can be instigated from top management and may involve the academic viewpoint as well as the corporate administrative priorities.

An example of an IT mission statement from Franklin University's IT team illustrates this user-involved approach to IT strategic planning. This technology deployment team is made up of user managers, business users, student users, academic staff and the IT manager:

"The Technology Deployment Team will: establish short and long-term objectives, plans, and priorities of strategic technology-based applications which meet or strengthen the Universities mission; promote effective technology use by faculty, staff and students; establish policies and standards related to the acquisition and maintenance of computer hardware, software, and data; formulate policies, rules, and procedures in conjunction with faculty and staff special interest groups for the purpose of securing the most cost effective use of technology resources on campus; communicate with faculty and staff regarding anticipated hardware, software, network and service needs" (Giuliani, 1996).

LITERATURE REVIEW CONCLUSION

This literature review of information technology strategic planning has investigated the general management influence, the end user computing influence, and has looked at various IT plans, particularly in the tertiary sector.

Strategic information systems planning can be formulated from a wide variety of influences. From a management perspective, senior management should be involved as both end-users and advisors in the SISP process. Non-IT managers do have responsibilities for the planning and use of IT in any organisation.

End-user computing generally, and key end-users and groups can have a major influence and input into the SISP process. The whole growth and diffusion of EUC has had an influence on organisations and their SIS planning.

Case studies and other IT plans from other tertiary educational institutes demonstrate the harnessing of end-users knowledge and advice into IT planning and the formulation of strategic IT plans. Finally there are unique IT planning challenges facing tertiary organisations such as Polytechnics and Universities.

CHAPTER 3

METHODOLOGY

This chapter describes in detail the methodology used in the study. Specifically, it presents a rationale for the adoption of a particular research approach, namely case study. It then defines the particular case under examination and discusses how the method for data collection was determined. This chapter concludes by describing the procedures employed for organising and analysing these data to build the case.

RESEARCH APPROACH

This study examines the particular phenomenon of strategic IT planning in order to gain insight and discovery, help and build information systems theory about innovation and change in professional practice. Given the nature of the research focus and the specific research questions, a qualitative was thought to be more appropriate than a quantitative approach, which is usually best suited to studies concerned with hypothesis testing.

Qualitative research in information systems covers several forms of inquiry that helps to explain the meaning of social phenomena with limited disruption to the natural setting as possible (Merriam, 1992). Qualitative research methods were developed in the social sciences to allow researchers to study social and cultural phenomena. Examples of qualitative methods are action research, case study research and ethnography. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions.

The motivation for doing qualitative research, as opposed to quantitative research, comes from the observation that, if there is one thing that distinguishes humans from the natural world, it is our ability to communicate with words and language. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live. Kaplan and Maxwell (1994) argue that the goal of

understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified.

CASE STUDY

An information systems study examining the strategic IT planning of an organisation, and surveying the user communities, lends itself well to the use of the case study methodology. Case study allows a wide range of evidence and document gathering without the restrictions of, say, the survey method alone.

Llanes (1999) sets out six sources of evidence when using the case study approach: documents, archival records, interviews, direct observation, participant-observation and physical artifacts. Most of these sources of evidence were used in this case study of EIT. Yin (1994) defines a case study as “an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”

Benbasat (1985) also describes the case study approach: “A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or more entities (people, groups or organisations). No experimental control or manipulation is involved.” Based on this description, the case study methodology is well suited for this study of EIT information technology strategic planning including end user participation. Winegardner (2000) describes the qualitative nature of case study research as suiting situations where the researcher is the primary instrument for data collection and analysis, and the end product is narrative and descriptive. Winegardner also sets out the characteristics of a good qualitative case study researcher as having a tolerance for ambiguity, sensitivity to context and good communication skills.

The case study is an ideal methodology when a holistic, in-depth investigation is needed (Tellis, 1997). As this study of EIT is required to take into account many different players and stakeholders in the description of the strategy planning process then case study would seem to be an ideal method.

Interestingly, Tellis overviews a questionnaire (survey instrument) to help illustrate the case study research methodology for a tertiary organisation such as EIT. This instrument shows categories of questions such as:

Technological Development

There is considerable support for the acquisition of PC networks within my department.

Access to the Internet

Structural Arrangements

University policy has provided effective guidelines for computing use in the university

This outline of questions would provide a good model of a suitable research instrument for an IT case study of a polytechnic or university. The categories of questions include technological development, structural arrangements, the socio-technical interface, the political-economic environment and the benefits or problems.

THE EIT CASE STUDY

As this study will study systems and people within their natural setting at the Eastern Institute of Technology, employing multiple methods of data collection to gather information from many internal sources, then using the case study research methodology seems the most useful. As part of this case study approach, survey instruments were used, interviews and general observation.

DATA COLLECTION AND PROCESSING

STAFF SURVEY

Questions were formed for the staff survey by considering the involvement of users in the EIT planning process. It was known that all departments had met with corporate and Computer Services to begin strategic planning for IT. So questions were framed to see if users had found this process beneficial and how involved they had been. It was also known through informal discussions with staff that some of the user IT planning sessions spent some time covering problem and support issues in IT.

The intent of the questionnaire was to focus users on more strategic and planning issues rather than general IT support issues. Questions were framed to gain understanding on the users level of involvement in IT planning, how they viewed the importance of IT planning and where they saw responsibilities lying. Other knowledge sought included what IT projects they were involved in for the future. Therefore the questionnaire was constructed as a blend of end-user computing viewpoints with how users saw the management of IT from a more senior level.

Notification of the survey was made to all staff at EIT by e-mail. The e-mail contained a hyperlink to an online questionnaire web site at infopoll.com, and an attachment with a document copy of the questionnaire. Staff could then complete the survey by web-site questionnaire, electronic copy attached to e-mail reply or return a printed copy of the survey to the researcher. The response rate was 52 surveys from approximately 260 fulltime staff, giving a 20% response rate. The web site at infopoll.com also automatically summarised the results for the majority of returns, leaving only the emailed and paper forms to add to the summary statistics. The results of this survey are discussed in chapter 5 while a text-only copy of the survey form can be found in appendix B of this study.

THE STUDENT SURVEY

Notification of the survey was made to selected full-time computing students at EIT by e-mail. The 80 students selected had studied at EIT for at least 6 months and for up to 3 years. They were a selection of Certificate in Business Computing (CBC) students and Bachelor of Computing Systems (BCS) students. The email contained a hyperlink to an online questionnaire web site at infopoll.com, and an attachment with a document copy of the questionnaire.

The response rate was 52% with 42 students responding from the 80 targeted.

A text-only copy of the student survey can be found in the appendices, while the results are discussed in chapter 5.

THE INTERVIEWS

Structured interviews were also held with the CEO of EIT, the Corporate Services Manager, and the Computer Services Manager.

The questions were created with the purpose of trying find out how senior managers viewed the activity of end-user computing and how these managers viewed the overall governance of IT. The dialogue from these interviews is displayed in the appendices of this study, while the results and discussion of the interviews is in chapter 5.

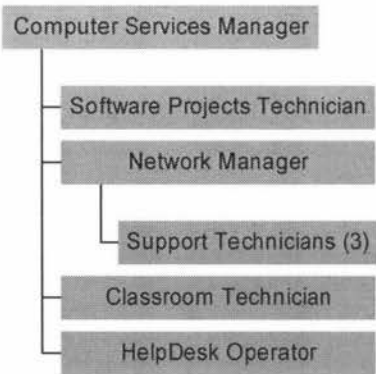
Documentation was gathered from previous and current IT planning processes. The 1995 first official strategic IT plan was found along with a 1997 planning document called the ISSI (Information Systems Strategic Issues). A more recent pre-planning IT document was circulated in mid-2001 and this was used as a major recent planning document based on user consultation. As well as using the surveys, interviews, and reports for data collection, an insiders understanding of EIT as an organisation and its staff was helpful during the case, characterising an ethnographical approach. .

CHAPTER 4

BACKGROUND OF IT MANAGEMENT AT EIT

This chapter presents the specific details of the case of EIT staff, users and the Computer Services section, and their strategic planning process. It is presented as a descriptive set of events from the publication of an information systems strategic issues (ISSI) report in 1997 to the beginning of the new IT strategic planning cycle (July 2001) through until March 2002. Relevant information about the history and development of information technology services at EIT is also presented to help background the scene.

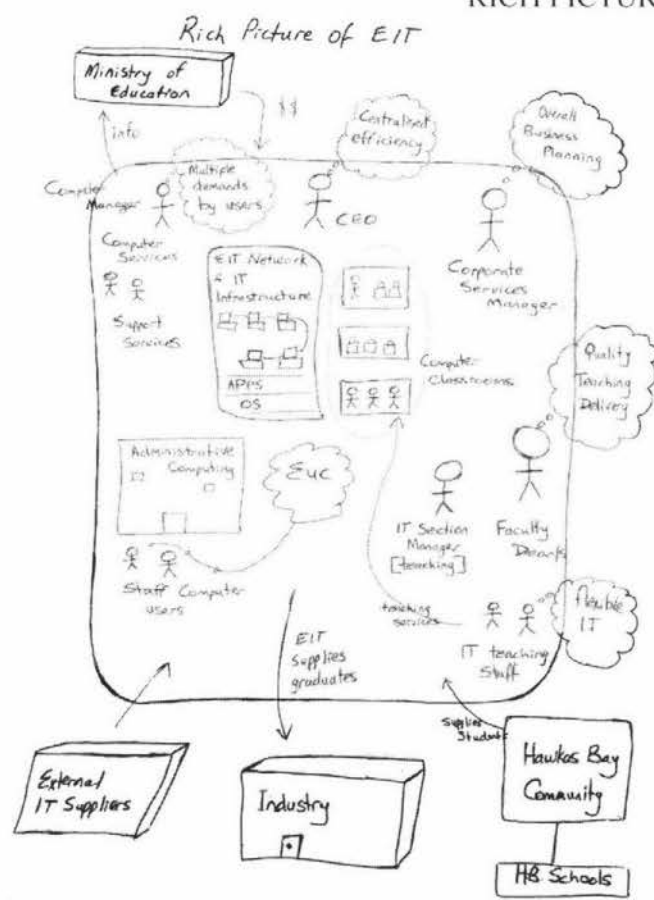
The Computer Services department was founded in 1992 as a separate section reporting to the Corporate Services Manager. Up until 1992 a sole computer technician was under the dual jurisdiction of a combined IT teaching manager and Computer Services Manager. From 1992 the Computer Services section grew from one manager and one technician to a total of 10 staff today, as shown in figure 1, including a newly positioned Computer Services Manager. Their duties are split between administrative non-academic IT support and academic computing (classrooms) support. However, there is now one academic computer technician (outside the Computer Services section) working directly for the IT teaching section who looks after two unstructured computer labs.



(Figure 1: Computer Services Staff structure.)

Management culture at EIT is best described as a matrix of interwoven responsibilities, as illustrated in figure 2. The core business is education so Faculties organise to directly deliver this core business; however the corporate staff function can and does over-ride this self-determination at various points. Traditionally, there has been a divide between the academic staff and support section staff. This has also been reflected in union activity and pay rates, which are generally, lower in non-academic positions. A historic and traditional attitude amongst academics is to view all service sections and staff as “operational support” therefore it is difficult for a department such as Computer Services to be an equal partner in strategic planning.

RICH PICTURE



(Figure 2: Rich Picture of EIT)

HISTORIC EIT INFORMATION SYSTEMS ISSUES

In 1997 the Computer Services Manager circulated an information systems strategic issues (ISSI) report as a seeding document to raise staff awareness of IT issues, gain financial commitment to improve IT infrastructure and prompt for ideas on the future development of IT.

In 1997 the ISSI report outlined the network infrastructure, describing the mixture of fibre optic and copper cabling with no cabling standards being enforced until 1997. All these installations were well below minimum industry standards.

The goals set from viewpoint of the network infrastructure included:

- The introduction of Internet protocols to the EIT network
- The replacement of proprietary technology with industry standards
- The implementation of redundancy with all major purchases
- The increasing of bandwidth of the computer network backbone
- The integration of satellite sites into the campus network
- The integration of all new cabling to increased standards

The 1997 ISSI report outlined the current use of the Internet, where at that stage only email was widespread, and a small number of academic staff had full Internet browsing access. Students had limited Internet access at specific classroom times. The goals for the Internet at this time were:

- To implement Internet standards
- To make all required Internet services available
- To enhance the Internet presence
- To develop an “Acceptable Usage Policy” for staff and students
- To improve secure electronic communication
- To improve secure Internet access for students and staff
- To provide courses via the Internet

The e-mail system in 1997 was not standards based and the goals at this stage for e-communication included setting up a standards-based E-mail system, which incorporates advanced desktop features. Other aims at this stage included developing a bulletin board, chat rooms, computer telephony and a room scheduler.

Some concern was raised in 1997 about the undeveloped security systems on the computer network and the physical facilities. The security goals discussed at this stage were:

- To promote controlled building access after hours
- To separate the academic and administration networks
- To control and monitor access to the Internet by individual users
- To investigate controlled access from external areas to the EIT network
- To develop clearly defined, implemented and documented security standards, policies and procedures which are supplied to all managers, users and support staff

In 1997 computer literacy was considered to be low and security awareness also low. Several goals were set to increase the computer skill level of staff:

- To promote computer proficiency training and certification
- To promote a new employee orientation program for computer use
- To promote security awareness training
- To review training opportunities to ensure they are current
- To encourage training using different media
- To publish solutions to common problems via the Intranet

In 1997, Computer Services consisted of 5 staff:

- 2 systems technician
- 1 Project technician
- 1 Electronic communication technician
- 1 Manager

In 1997, it was felt that the workload of the technicians was too high. During the academic year the number of incoming faults was higher than the number of problems solved. Computer Services staff at this stage did not have time for project, training, staff development or documentation of their work. At this stage of time they had difficulty finding the time to advise staff on the status and progress of work on their computing problems. The number of PC's was increasing quickly at this stage and this trend has continued on until the present time. The Computer Services section highlighted the following goals at this stage:

- To increase staffing levels, salaries, and budgets to enable Computer Services to provide excellent user support, and to carry out personal development, training and project management.
- To reserve time to develop documentation and procedures
- To increase staff competency to support current complex computer applications and environments
- To improve the accessibility of technicians
- To increase resources and computer based tools to support satellite sites
- To enable Computer Services to advise staff on progress or status of their problems

During the first semester of 1997, Computer Services introduced a helpdesk for all computer systems used by EIT. A roster of students staffed the helpdesk. For security reasons, students were limited in what they are allowed to do. In general this limited the helpdesk to recording and tracking problems. The major benefit of logging calls is that

problem and fault patterns can be detected and addressed. After this limited but successful prototype helpdesk initiative, goals were set to set up a permanent helpdesk with fulltime staff. These goals were:

As the Computer Services section had grown rapidly from a small one-person section (1990) to a larger support centre, standards had not been strictly set. Industry commentators set the total cost of ownership (TCO) per PC at over \$10,000 when taking into account all of the surrounding factors. This would include hidden costs of staff coaching each other, lost productivity, complex installations, software applications and hardware.

In 1997, the Computer Services Manager voiced concern with the high section workload and how this was preventing documentation of all aspects of the IT infrastructure. Documentation has been lacking from before this time as well, for example the consistent configuration of classroom software could not be guaranteed without appropriate documentation

As Hawke's Bay is a high earthquake risk area, a disaster recovery plan was set as a goal of high concern. At this stage EIT had no redundancy element included in its design. The likelihood that the network would not be available for extended periods was high as no spare parts for the network were kept by EIT.

The student management system was the major MIS even in 1997 and a pre-release of Artena (the student management system) was being tested at this time. Further development of general management information systems was being hindered due to the forth-coming development of Artena. A coordinated effort was started to reduce the number of "home-grown" applications and systems.

The requirement for all new MIS systems was set at this stage to make sure that all new systems interacted with each other. This would allow consistent reporting on paper and electronically from all systems.

Goals were set in 1997 from the ISSI report regarding MIS systems at EIT which were:

- To provide a reliable network infrastructure for the Artena system
- To facilitate the implementation and development of new features for the Artena system
- To keep all MIS systems up-to-date
- To investigate the use of MIS systems
- To consolidate the use of MIS systems
- To promote coordination of MIS systems development between faculties
- To implement a client-server based solution of the SUN (financial) system
- To increase the availability of the financial system to include all budget managers
- To investigate research into the requirements of a professional Human Resource system

In 1997, the network was not configured to provide secure access from off-campus areas. A huge potential was found for increasing the point of access for staff and students. It was thought that more efficient use of staff time could be gained through the intelligent, but controlled access, to the network. Also at this time, EIT did not offer distance learning, however there was some demand from faculties to provide an “electronic classroom” to keep in contact with students. Other groups that were thought to benefit were; students with special needs and satellite campuses. Video conferencing was another potential technology that was raised as a potential delivery method. Computer Services set further aims in the ISSI seeding document as follows:

- To assist with the IT requirements in the introduction of distance learning
- To introduce an electronic chat facility
- To introduce a bulletin board for staff and students
- To introduce video conferencing
- To investigate the introduction of IT facilities to assist EIT to target new client groups who cannot travel to courses.

Computer classrooms and learning skills centres were scattered across the EIT campus in 1997 (and this is still true today). Computer Services staff and specialist equipment was also in separate locations and this meant a delay in the case of equipment failure. Security after hours was also an issue, and for this reason after hours access to computer classrooms and labs was not available after 9pm.

A proposal was made at this stage for a new technology building which would house all computer classrooms, labs, IT teaching staff, Computer Services staff and provide longer, better access for students.

As an outcome of this recommendation and other initiatives from the Faculty of Business and Computing, a new technology building was started in March 2002, and will be ready for use in February 2003.

In 1997, the number of computers in the Faculty of Maori Studies significantly increased after a dedicated computer suite was established. The faculty successfully tested a Maori language software application, Te Kete Pumanawa Rorohiko, which has been used to develop course material and is essential to display and print in Te Reo Maori. Computer based training (CBT) was also considered at this stage, to teach Te Reo students at their own pace, as CBT was seen working at other institutions.

Interestingly, in this ISSI report, the authors of this document, the Corporate Services Manager and Computer Services Manager, are directly setting down educational strategy for the Faculty of Maori Studies. Another interpretation of this section of the report may be that it is reflecting a consistent request from this faculty.

In 1997, no facilities had been designed for special needs students or staff, and it was thought that the Learning Skills Centre would benefit from these facilities for this group of clients. A wide range of hardware and software products was recognised as available to assist people with special needs. A registry of these products would benefit the organisation and would enable Computer Services to respond rapidly when the need for

special assistance arises. New technologies such as voice recognition and enhanced keyboards could be tested to prepare staff for their use. It was believed that using specialist technologies for special needs people could give EIT a competitive advantage by catering for this client group.

It was recognised in 1997, that with the Internet, new approaches to teaching were rapidly emerging. The ISSI report outlined the ability to communicate from remote rural areas with international research and teaching facilities would change the way education is delivered. Already, at this stage, EIT was collaborating with other institutions within New Zealand and overseas to provide courses of the highest possible quality. It was noted that as competition between educational institutions increases, the flexibility in course delivery had to increase.

It was believed by the authors of the ISSI report that the development of online multimedia materials and structure would reduce the requirement for teaching in classroom situations. Computer based training could be carried out either at the institute or anywhere else in the world. It was noted that the network infrastructure and buildings have to be flexible enough to allow rapid changes.

No document management system had been developed at EIT, and this was exposed as a growing need in the 1997 report. Concerns were expressed how information is lost when the creator of a document leaves EIT, without a systemised storage mechanism for retrieving various documents and spreadsheets etc. It was recognised that other companies were beginning to use the Intranet as an internal publishing system, with recent developments towards knowledge portals. This type of use of the Intranet was envisaged for EIT and would require clear guidelines for staff, and tracking/controlling the thousands of documents that

The ISSI report covered many functional areas of IT at EIT and ranged from operational aspects such as backing up of data through to forecasting new online learning paradigms. Some of these ideas and issue probably arose from user request and demand, which was

known at the time. While other topics involved some external and internal environmental scanning to address probable future issues and strategies with supporting IT systems. This raised the issue of whose responsibility is it to start forming strategy about, say, online learning. By default it appears the Computer Services section raised the issue but concrete details were left to the user groups (Faculties).

The report was probably pitched also as a “selling” tool for financial approval and leverage by senior management. Many of the less glamorous IT infrastructural enhancements written about are often invisible and thus are at risk of being ignored for capital allocation. This type of document maintains justification for these IT operations.

The 1997 ISSI was not a concrete plan with actual IT plans with dates set, but hopefully would have prompted discussion amongst users and managers. This discussion and feedback would shore up support for IT strategy users identified with and possibly leave the Computer Services Manager to justify other IT goals without user support. One outcome that did seem to arise from this fairly negative picture painted of the current situation of IT was an increase in staffing levels to 10 in the Computer Services section over the past 5 years from 1997 to 2002.

APPLICATION PORTFOLIO STUDY

In 1998, a management study of EIT was undertaken to quantify and qualify all information systems applications at EIT.

The following list of applications was identified:

1. Artena (Student Enrolment System)
2. A-Plus (older Student Enrolment System)
3. BEIMS (Building and Engineering management system)
4. Asset Management
5. Sun Accounting and financial system
6. Payroll – stand-alone
7. Results systems in different faculties
8. Query sub-systems for EFTS (Equivalent Full Time Students) Provided for senior management and the MOE
9. Groups of documents on department network drives
10. Set of integrated spreadsheets for Budgeting
11. Human Resources system
12. Marketing stock control and enquiry logging system
13. Minor databases and stand-alone systems
14. Library Catalogue system
15. Computer Classroom systems for teaching
16. Room Bookings
17. QMS Quality Management System
18. Voice Mail
19. Photocopying Control and Charging

Once a complete list of applications had been compiled then a model called the Application Portfolio (Remenyi, 1991) was applied to help judge the value of each application.

Remenyi (1991) outlines a grid for evaluating the suite of applications that an organisation may have. This matrix helps evaluate a firm’s ability to use IS strategically.

Degree to which the firm is functionally dependent on IT		
High ←	Low	
Strategic	Turnaround	High Degree to which IT Developments will create competitive advantage ↑
Factory	Support	Low ↑

(Figure 3: Application Portfolio. Adopted from Remenyi, 1991)

Strategic systems are those where the competitiveness of the firm is very much dependent on these information systems. These will have a high importance and will require a higher level of funding and resources. *Turnaround* or Leading Edge Systems, are those systems are not a vital part of the organisations IS but may represent research or experimental projects that may lead to successful strategic systems with competitive advantage. *Factory* systems are those systems for day-to-day use. The organisation is dependent on them for efficiency (doing things right) and effectiveness (doing the right things) of management but there is little competitive advantage in these types of systems. *Support* systems generally do not provide the firm with any significant advantage currently or in the future, but are necessary for the existence of the firm, providing record-keeping activities, e.g. payroll, debtors and other transaction processing systems.

So mapping EIT’s systems on this strategic analysis grid we have:

Degree to which the firm is functionally dependent on IT <i>High</i> ←———— <i>Low</i>		
Strategic Artena Sun Accounting QMS Library Catalogue	Turnaround Intranet Internet Online Learning	<i>High</i> Degree to which IT Developments will create competitive advantage ↑
Factory BEIMS MS Queries Workgroup Documents Budget Spreadsheets Marketing Enquiries Classroom systems Room Bookings	Support Asset Payroll Results Human Resources Marketing stock Voice Mail Photocopier control	↑ <i>Low</i>

(Figure 4: EIT Application Portfolio)

As shown on the illustrated application portfolio model (Figure 4), in 1998, Artena would have been considered the main strategic system currently in use as it provides more information on customers and activity. It has also re-engineered business practice to some extent to conform to system requirements. The Sun accounting system would also be considered strategic by allowing quick analysis on financial allocation.

The QMS system has strategic value, particularly with academic accreditation panels who are assured that quality management procedures are in place. This has had particular importance with EIT gaining degree level status from the NZ Qualifications Authority (NZQA) as part of a strategic thrust. The library catalogue system also has strategic value particularly with pressure on research activity to expand with higher qualifications being introduced.

This overview of all-important applications has implications for the oversight and management of IT resources at EIT and the degree of user group involvement in their development and ownership.

THE 2001 IS REVIEW

Later, in 2001/2002, a review of the information systems strategic plan was undertaken to reflect on what has been achieved and to identify what directions are seen as important for the future development of IT at EIT. As commented in the pre-planning IT report (2001), technologies change the way people learn, do research, manage activities and interact with one another. One thing that has been reinforced in this review process is that change will be ongoing and much of it is unpredictable. The aim of EIT's Computer Services is to strive to provide leadership in information technology, to build efficient and reliable institutional IT systems, and to provide support for IT activity in order to create the IT environment needed to achieve its goals in the future.

THE ACTUAL EIT IT PLANNING PROCESS

A discussion document was produced by EIT's corporate and computer management and used as the basis for consultation with managers and staff. Discussions were also held with various industry bodies to elicit views about technology and its impact on EIT. These discussions highlighted four key areas as being of importance in the future:

- The impact of the World Wide Web
- The rapidity of change
- The way IT has become part of EIT's activity, and
- The need to improve the way staff work

The process used to complete the EIT review has been to research the IT achievements, the present state of IT at EIT, and investigate issues for the future. This process also involved consultation with staff, students and industry, then the development and consideration of a draft plan. Finally, it is envisioned that EIT will adopt a final version of a new IT strategic planning report.

THE DRAFT EIT IT STRATEGIC REPORT

The final draft EIT IT strategic report outlines the present situation, the future IT strategies, the changes needed and, finally, a list of proposed improved systems in response. To ensure that all managers take ownership, a list of critical success factors is to be generated by the senior managers forum.

In summary, EIT's IT services are presently characterised by the following features:

- All EIT staff at the Taradale and Hastings campuses have access to the institution's networks, enabling them to connect electronically with their colleagues on campus around the world.
- There are 15 instructional facilities on the Taradale campus, two in Hastings and one in Waipukurau.
- All students on formal programmes have access to EIT's networks and resources with more than 5,000 students currently utilising these resources (which include Internet access and email).
- The campus network is connected to the World Wide Web via a 1.9 megabits/second link.
- The on-line delivery system Blackboard provides access to a growing number of courses, with more than 1,000 students enrolled to date.
- The wireless LAN connects the three Hastings sites to the Taradale campus, and provides remote access for students with disabilities.

Some statistics about the current IT systems include 10,000 student login ID's and 500 staff login ID's which gives some indication of the size of IT operations at EIT.

Future IT strategies are influenced by EIT's general strategic direction, which is characterised by a move to higher level programmes, usually degree based and the development of research activity. Other strategies include less focus on class contact as the sole means of delivery and the increasing importance of IT as an element of support for academic endeavours. EIT's strategy also intends for every student to be able to use IT systems as part of the learning process. As a consequence of these future strategies, IT strategic planning will seek to incorporate these elements of change.

The single most significant change that has occurred in recent years has been the development and influence on society of the Internet. Many aspects of society have been changed by the web and this has impacted on educational institutions. For example, growing numbers of potential and current students are using the Internet to access EIT's networks which contain much of the institute's information and intellectual property. This phenomenon has given rise to the following essential strategies for EIT in the near future:

- a) The development of the EIT website including expansion of the lower levels of information (faculty and section level), as well as links to services that can be provided (such as the library catalogue). This development will utilise technologies such as databases, and concepts such as portals.
- b) Development of expertise in the use of web-based delivery systems (but not to the exclusion of other delivery systems) by staff.
- c) Improved information about the use of the Internet by potential students, enrolled students, staff and others, and the impact this has on EIT's marketing, delivery and support services.
- d) Evaluation and adoption of developments in communication technologies (for example, person to person video conferencing)

Information technology has become interwoven into the fabric of the way EIT works. As a result the ability to provide highly reliable and accessible systems is an imperative. To be successful however, key users (especially managers) must be proactive in maximising the use of IT. Strategies, which the strategic report recommends, include:

- a) ensuring that the network, and associated hardware, meet quality standards;
- b) ensuring that software is appropriate for EIT's needs;
- c) ensuring that backup systems and contingency plans are in place and tested;
- d) ensuring that all staff have the appropriate training and expertise

The library is expected to remain an integral part of the learning process as an access point for a diverse range and type of information and services. In this regard EIT will need to ensure that the skills and expertise of staff (not just library staff) match the way people use new technologies in the learning process.

In some cases information technology resources will be increasingly located where research and learning activities occur. For example people working in a laboratory situation may need access at that place to IT resources. There is still debate about the extent to which resources should be decentralised. As many technologies have not even been designed or conceptualised, EIT will need to be prepared to research what is happening, to evaluate changes and to invest in new technologies where justified.

Specific strategies include:

- a) Keeping pace with developments but doing this in a systematic way involving user consultation, testing, evaluation and justification of plans to adopt new technologies.
- b) Using information technology and information systems to gain competitive advantage for EIT (for example by maintaining the effectiveness of student management systems)

- c) Being flexible in evaluating and adopting new approaches to the delivery of learning using technology
- d) Providing research and development time for Computer Services staff, and ensuring that Computer Services staff have appropriate professional development opportunities
- e) Benchmarking with other tertiary education institutions as to how technology is being applied, while ensuring competitive advantages are not diminished.

The 2001 IT strategic plan points out that making use of the investment made in IT and improving the way people work is a natural progression. IT systems have the potential to improve productivity, but simply investing in technology does not result in improvements in the way EIT operates.

The 2001 report notes that investment might not always be incremental. In some cases rapid development and fast change necessitate a major change with the associated investment and increased risk so it is imperative that the change process be managed effectively.

Strategies for this include, making ongoing improvements in MIS systems; financial, human resources and student management systems. Other strategies which will improve systems include developing an integrated document management system, increasing the skills of staff, integrating voice and data systems and enabling online enrolments, access to academic material and records online.

Outlining these strategies begins with improvements to important MIS systems that support EIT's drive for excellence. This includes the main MIS, the student management system that involves most key user groups and is most crucial for EIT's overall management.

Critical success factors (CSF) are those things that must happen during the life of this strategic plan for EIT to succeed, and the CSF's have not yet been identified. CSF's are the factors that must be done well and their identification needs the involvement of management to link them to the strategic planning of the organisation. An example of a CSF might be the development and adoption of a structured plan for upgrading the IT skills of staff. In January 2002 the issue of critical success factors was tabled for all senior managers to contribute ideas for developing a list of CSF's and signal some sense of ownership for the IT planning report. However no further CSF's were added at that stage.

As part of the consultation process for the new proposed IT strategic plan, the following groups were involved in separate meetings and discussions:

- The ISSP group: this group is made up of the Computer Services Manager, the IT Teaching Section Manager, the Administration Manager and one Faculty Dean.
- Faculty of Arts and Social Sciences
- Faculty of Business Studies
- Faculty of Health and Sports Science
- Te Manga Maori
- Faculty of Science and Technology
- Education Services Section
- Computer Services Section
- Other Service Sections
- Business Studies Advisory Group

Further to this internal consultation, external industry organisations were consulted:

- Ericssons Ltd
- Telecom NZ Ltd
- Cyclone Computers
- Olympic Software
- Novell NZ
- Pan Pac
- Clear Communications

According to Marshall, the Corporate Services Manager, these external consultations provided general directions for EIT's strategic future. Some of the technologies raised by the external consultation included;

- the importance of using the new communication systems that are developing (but acknowledging that they are expensive and constantly changing)
- the growing use of the web
- the need for businesses to be able to communicate electronically and some growth in e-business which EIT might make use of

The final product of all of the consultation was a "Planning for Information Systems and Technology" report. The report is fairly brief and the Corporate Services Manager believes that this report, although the outcome of months of consultation, will be used as a seeding document for further and fuller ideas and strategies for the future once circulated and discussed again.

In February 2002, a new Computer Services Manager position was appointed to take on a more strategic role within EIT. This was a new position created with the technology operations management function split from the more strategic IT management function. The new Computer Services Manager fulfills a new strategic role while the previous Computer Services Manager takes responsibility for network and technical management.

FACULTY OF BUSINESS MEETS WITH IT MANAGEMENT

As an example of IT management meeting with faculties, the Business and Computing Faculty was chosen for this paper as an example of the type of meeting, and the scope of ideas that arose between the users and IT management. Halasz (1997) in his “issues” report identified critical issues facing EIT at that time and proposed goals for addressing those issues. This “Information Systems Strategic Issues” report was developed after consultation with faculties and administrative sections at EIT. This report outlined the deficiencies and goals (as at 1997) in terms of the campus network, Internet access, intranet, security, resourcing and standards. In a recent (July 2001) report entitled “Planning for Information Systems and Technology” it states that Corporate Service’s mission is to be the technology partner for all members of the EIT community. Minutes of the strategic planning meeting (2001) between the Business faculty and Corporate/Computer Services Managers listed the current situation issues as:

1. Reliability of current network,
2. Communication with IT support staff
3. Email contact with students
4. Blackboard (E-learning system) restrictions
5. Help Desk not used as too many problems
6. Help Desk response time
7. Structure of the IT section – no partnership
8. Student database system deficient
9. Air conditioning in computer classrooms

The meeting notes also listed a number of possible future IT applications:

Interactive TV

Access to LAN drives from home (for staff)

Integration of teaching systems (Blackboard, Intranet, notes, content)

Student Notebooks (Computers) used on campus network

24 hour computer room

Data shows widespread

Commercial sponsorship

House research organisations on campus

Standardisation of technical infrastructure, Microsoft?

Use of roving IT consultants to communicate alongside general/teaching staff

An IS strategic manager (in addition to the Computer Services Manager who is more an operations manager)

Ecommerce

Knowledgeware

Deliver at high schools via video link

Virtual Private Network

A better defined service level agreement (SLA) and expectations

This list was collated and used as input into the strategic IT plan (2001) by Corporate Services at EIT, as were all the meetings between IT management and Faculty or Sections.

CHAPTER 5

RESULTS AND FINDINGS OF THE EIT CASE

The 2001 IT plan outlined the current state of the information technology infrastructure and included the current state of the important MIS systems. Future strategies were outlined in a more general sense setting the overall strategic direction and influences without necessarily proposing concrete systems as part of this strategy yet. The Internet was described as a major influence in the way people expected access to information and a major influence on society in general. The essential strategies were listed as; development of the EIT website with portals and expansion of services, staff expertise in web-based delivery systems, more information about student use of the Internet, and the ability to evaluate communications technologies for possible adoption.

There was no allocation of responsibilities in pursuing these strategies, and the Corporate Services Manager believes there will be more feedback forth-coming from users and user groups as a result of this IT strategic report.

The strategic plan reiterates the need for a high quality reliable IT network as a backbone for any further IT developments. The plan also confirms that key users, including managers, need to maximise their departments' use of IT rather than wait for Computer Services to explicitly demonstrate every potential feature of software systems or the network. Graves (1998) confirms this need for active user participation when he says that even the IT architecture must have the input and participation of other technology support organisations such as the library and the teaching sections.

STAFF SURVEY RESULTS

A survey was sent to all 260 fulltime employees at EIT asking them to respond to questions relating to their input as a user into IT planning at EIT. 52 staff (20 percent) responded. Some reasons for the low response rate may include a lack of Internet access by administrative staff, a lack of motivation by some staff who may feel an academic study may have no impact on changes at EIT, and perhaps the fact that the survey focussed on strategic planning of IT rather than support issues. If support issues had been the focus of the survey probably more users would be motivated to comment as this is closer to day to day computing for staff.

There appeared to be some emotive responses in some questionnaires, which may indicate some respondents were motivated by dissatisfaction with IT services so the overall results may be skewed in a somewhat negative vein. Over 60% of respondents said they had attended a meeting with Corporate Services to discuss future IT planning, however only 48% had been involved with IT planning within their own departments. Given that the Corporate Services Manager had set up forums with every faculty and department at EIT, the 60% figure seems lower than anticipated but may be due to some staff not attending the planning sessions although representatives from their section had met. Or this may mean that some user staff were not notified or invited by their managers to attend the IT/User liaison discussions.

The survey seems to indicate that a very high percentage of EIT staff are computer skilled, with all respondents seeing themselves as either a competent PC user or with excellent skills. Over 70% believed that they had a good IT knowledge in a general sense as well. This may indicate that non-IT staff are in a better position than before to make informed comment on IT planning, as well as showing that EIT has achieved almost full diffusion of IT throughout the organisation.

All respondents agreed that IT would have a major influence on EIT's success in the future. However most respondents felt that EIT was not on track for the strategic use of IT or able to enable their department utilise IT strategically through the use of the internal Computer Services section. Over 80% believed that IT planning should not be left to the IT department but should be the responsibility of the business unit (or teaching section/faculty). This viewpoint of EIT users is supported by Graves (1998), who points out that IT planning is not solely about developing plans for centrally purchased and controlled technologies but about a plan that users can manage for themselves at least in part. Users themselves recognise that IT is increasingly their responsibility to develop, fund and monitor strategic IT systems in conjunction with the support of the IT organisation (Graves, 1998).

69% of respondents believed that IT management was not being represented at a high enough level. This could be interpreted in two ways: either, that the Computer Services Manager was not reporting at a high enough level (senior managers forum) or that other non-IT senior managers were not acting sufficiently as catalysts and sponsors to IT projects and initiatives. This viewpoint by staff respondents is backed up by Foster et al (1999), who discuss the need for IT governance to be represented at the highest level of management structure, explaining that the leadership required is more than being able to operationally control the IT function, but to also be politically and strategically aware of the major issues facing the organisation. Kobulnicky (1999), also supports this staff opinion that the IS senior management must do more than efficiently manage the current set of IT resources, by adding that the IT manager must describe the degree of change expected in the tertiary institute's mission and the role that modern information technology should play in that transformation.

Respondents rated the Corporate Services Manager as the highest influencer of IT planning at EIT, followed by the Computer Services Manager, with the CEO and respondents own managers seen as having only average influence. The EIT council and user groups rated only low influence on IT planning.

A “white paper” initiation IT planning document put out by the Corporate Services Manager and Computer Services Manager in mid-year 2001 had not been seen by 30% although it had been widely circulated throughout EIT. 56% of staff respondents had viewed this pre-planning document. The remainder were not sure. Although most users were IT literate and recognised the importance of IT, they believed they were having only a small influence on IT planning.

This response indicating that users feel they have only a low real influence should concern management at EIT, as it may indicate that even although staff have been consulted through the series of meetings, they still do not believe this will have a major influence on the ultimate IT plans. This warning is referred to by Moran (1998) where users have given up listening or tuning in to the “official” corporate IT plans, they are too busy planning their own vision and plans for IT. This intuitive ability of users to be able to discern what is of real value to them was illustrated in the move from mainframe dependency in the 1980’s to small PC based systems rendering large systems and personnel redundant. “Companies have gone away from mainframes and moved to networks of PCs, super servers, or whatever you want to call them.” (Brancheau, Janz and Wetherbe, 1995)

A mixed response was given as to who should set the long range IT plans at EIT. 46% thought that the CEO should set the long range IT plans, 58% thought that the Computer Services Manager should set them, 46% believed other senior managers should have primary responsibility, while 58% believed that faculties or sections should be the ones setting long-range IT plans and strategy. Respondents were able to choose more than one planning person/group.

This suggests that the domain of IT is not clearly delineated in the minds of most users at EIT, and there may be genuine confusion or unclear assumptions over who should be leading direction for IT strategy. Or this may indicate an underlying willingness to have all players and sponsors to be involved; non-IT senior managers, IT staff, the CEO, and the user groups.

Staff users at EIT indicate they desire strong IT leadership at the highest levels, but also wish to have wide user involvement. There may be an underlying tension between these two expectations because as Bjerknes and Bratteteig (1995) point out, the modern knowledge worker today has a low tolerance for strongly authoritarian IT departments making all decisions regarding computing

The benefits of pushing IT strategic direction to the user community include; the ability to quickly utilise new technologies as they become available, and empowered employees motivated to innovate and take risks. But as Gadiesh and Gilbert (2001) point out, in a single company it's difficult to achieve both decentralised decision-making and coherent strategic direction. If strategic principles have been set throughout the organisation, such as “enabling learners to access content anywhere”, then academic sections can work their IT plans and policy in line with this guiding strategic principle.

43% of respondents used the Computer Services Manager for technical advice on IT planning, while 39% relied on their own manager, 34% on other IT staff, 26% on other section staff, and 12% getting advice from outside companies. The figure of 26% relying on their own users within their sections for advice may indicate end-user computing reaching some critical mass and knowledge level allowing unofficial non-IT “experts” to provide advice. This may indicate some unofficial networks of information amongst EIT users and user groups.

Despite the evolution of computer user communities and knowledge, this staff survey indicates that the Computer Services Manager is still where the biggest group of user goes when they need advice. Karat (1998) in his “Bill of Rights” for users, supports the users’ right to communicate with the IT manager or technology provider and receive a thoughtful and helpful response when raising concerns. Comments from the staff survey indicate some dissatisfaction with the attitudes and response from the Computer Services department even though 43% choose the Computer Services Manager as their main source of IT technical advice.

When asked what strategic IT goals their department is working on, the most common goal was to get up and running with an online web delivery mechanism called Blackboard. This integrated learning environment is installed and running but each department is charged with putting educational content in this platform.

Oblinger and Rush (1998) discuss how this type of web-based teaching delivery places pressure on the “middle-man”, where there will be the possibility of “disintermediating” both learning and student services. The staff survey did not indicate any concern from academic teaching staff that the Internet based systems like Blackboard, could lead to a reduction in demand for teachers and teaching hours.

Oblinger and Rush (1998) also observe that as educational viewpoints change from teacher-centred to learner-centred, technology serves as a catalyst for the development of learner-centred approaches to education. Although users and IT management are focused on Blackboard as a new delivery mechanism, no discussion seems to be taking place about how this could affect the entire teaching function. The staff survey did not indicate any resistance from academic staff who may find online learning strategies threatening to their traditional existence.

Some critical comments on the overall picture of IT planning and end-user computing came through when respondents were asked to write their insights. Some users felt there was a lack of planning for IT from top management, while others were obviously frustrated by the general lack of positive IT support for their own initiatives and current systems. Hussain and Hussain (1997) discuss how users seek release from the strict control of the centralised computer department, whose existence has often resulted in many delays for systems. In western democracies, modern workers have a low tolerance for strongly authoritarian IT departments and will simply remove support for the official IT systems and begin to seek their own systems (Bjerknes and Bratteteig, 1995).

There was a general feeling that an internet based delivery platform would be important in the future, but also a questioning of the level of finance directed into physical

resources (new buildings etc) coupled with a lack of serious funding for the “invisibles” such as IT systems. Regan and O’Connor (2001), support this funding view that end-user groups need the resources to initiate and develop IS projects themselves, as long as these projects fit into the overall IS strategy and framework and do not develop into “islands of IT”. There may be a conflict here between “old-world” bricks and mortar mentality amongst the senior management at EIT and the “new world” virtual systems such as E-Commerce and E-Learning projects. A new building may gain a 3 or 4 million dollar support but an equally strategic resource such as Blackboard may gain less than \$100,000. Integration of IT systems was also seen as an important issue to be addressed by the EIT management.

Some actual quotes from respondents included:

“There is a lack of planning and co-ordination of IT, not enough sponsorship and importance is placed on IT from the top, therefore we have an incompetent IT function.”

“No real strategic planning appears to be done, appears to be reactionary rather than revolutionary.”

“ There is a lack of a long-term plan. We seem to be in catch up mode most of the time.”

“Staff need support – the majority of my colleagues have very limited knowledge and understanding of the potential of IT for teaching etc.”

“ The Information Technology section (Teaching) is only one of the users of technology and there needs to be planning and consensus so that all areas of the institute are moving in the same direction.”

“I believe there needs to be more end-user involvement in IT strategic plans, from students, lecturers and administrators through the use of surveys and meetings.”

“Computer Services role in IT planning has not been very effective nor have we always found the technical advice they provide to be helpful or even correct.”

“We (the non-management staff) feel we are told what services we will get and have no power to control IT policy (e.g. Citrix – we were not even asked)”

“Pace of change is very slow in website.”

“Integrated development of Blackboard is going to be a key to the development of EIT as a provider of distance learning options offshore.”

“Senior management have not got to grips with the importance of IT planning and are only spending money on an ad-hoc basis. More “big picture, strategic thinking” needed, anticipating change. Stop thinking about buildings, and put a serious ½ million into IT.”

“EIT needs to recognise that without the technology we can’t compete. The intranet is also slow and a poor source of information. I’ve worked extensively overseas and have never before seen such inadequate resources. We need to give IT a priority for funding. It also needs new staff with industry experience not brand new graduates.”

“Blackboard, but IT not given the priority & IT staff suffering.”

“EIT must make a commitment to spend more on IT. “

“IT planning should be part of the strategic planning that is done annually per faculty, with an overall adjusted strategic plan being decided on for EIT through the involvement of Deans, IT services manager, Computer Services Manager, management representative...”

“Have just completed a Library Technology Plan for the next 3 years and will be adding first goals from it into next years library annual plan.”

“Libraries these days are huge users of technology. We have staff who are experienced and knowledgeable in what services we should be providing and what our users need. Yet our opinions are largely ignored or not understood by planning groups within the institute. EIT is way behind what other Institutes are offering their students/staff online and remotely. This needs to be addressed. “

“Wireless LAN for disabled students.”

“Computer Services providing excellent service to users of adaptive technology. A computer technician is doing a course relating to accessibility for disabled.”

“We need computers that work. Working on Blackboard. Citrix improvements.”

“Strategic goals: Blackboard. Sound Editing/ Production. Graphics CD for staff use in classroom planning.”

“Strategic goals: Technology Planning Document to encompass our future use and implementation of technology. This includes provision of databases and website services.”

“Need a more holistic approach to include the less technically inclined. More cooperation between faculties leading to a seamless application of technology.”

“It seems there is no real commitment by senior management to embrace and resource the IT department in this institute. Yet we can plough \$3 + million into a Regional Sports stadium.”

STUDENT SURVEY RESULTS

Full-time computing students at EIT were invited to respond to a survey that sought to judge their satisfaction with IT services and also to see if they believed they had an influence as computer users. A similar method to the staff survey was used to orchestrate the survey, with email being sent to each student, inviting him or her to access the survey on a web site link. 42 (52%) students responded from the 80 full-time computing students in the sample.

The overall satisfaction rating for computer equipment was 4.0 (where 5 is excellent and 1 is poor) and the rating for software services was 3.6. Students thought that the equipment and software provided by EIT was very good and this has been influenced by recent hardware upgrades to Pentium 4 levels, and operating systems upgrades to Windows 2000.

68% of computing students surveyed felt that IT services provided by the Computer Services section was either very good or good, while 8% of students rated the Computer Services section as excellent. The IT teaching department rated slightly higher with 73% of student respondents rating the IT teaching department as good or very good, with 23% rating them as excellent. Generally, the computing students appear very satisfied with EIT's provision of computer classroom environments with virtually no negative feedback on the academic computing environment.

Even more so than the staff survey, students rate themselves quite highly in terms of IT skills level and knowledge. 88% of student respondents rated themselves as good, very good or excellent PC users, while 87% believed themselves to have a good general knowledge of IT. This probably reflects an ongoing upskilling of students, but also reflects that all student respondents had been at EIT between 8 months and 3 years studying as full-time computing students.

While students appear satisfied with academic IT services and believe they are IT knowledgeable, 44% do not feel they are able to influence IT policy or IT services at EIT. This sense of having little influence as a user may be due to no formal student group for political lobbying apart from a more general students association.

It may also arise from the fact that the main channel of communication to students is from academic teaching staff and very little direct communication occurs from EIT officially to the student regarding IT services and future planning. When official communication does take place from EIT or Computer Services it is often in formal language setting rules and policy for behaviour or legal boundaries.

The student as user is in a unique position as they are an external customer using computers within the organisation's physical environment. Viewing the student user as an organisational user in the same light as a staff user may yield radical new ways of providing IT services and even physical working environments. Recent examples from other tertiary institutes show students and staff having similar office-like cubicles and mini-labs, which are bookable on a daily basis, as for example at UCOL, Palmerston North. This kind of strategy sends a strong message to the student that they are valuable to the institute, and may encourage staff to use tele-commuting techniques to organise their work-style.

Universities also provide examples of the student user provided for in the same way as a staff member, where post-graduate students share offices while pursuing study and part-time university tutoring.

Although only 56% of student respondents believed they could directly influence IT planning, 68% had used course evaluations to make additional comment on IT services and future needs. However 32% of these students, who would have completed many course and teaching evaluations at EIT, had not used this opportunity for comment on IT in general.

A resounding 92% of students believe that the IT plans for student computing should be set by the IT teaching department. However, as this was not a mutually exclusive question, 30% of students responded that the Computer Services section should also set the IT plans for academic computing. These interesting results would indicate that students primarily expect the academic faculty to set the IT direction, even though the teaching department is only a user group themselves. The students probably believe that the IT teaching section has the autonomy to create IT plans independently to fulfill their responsibilities to the students.

Some students were unsure of how they could influence IT planning as users at EIT, with some responses of “not sure” and question marks. Others felt confident of their ability and access to voice opinions, talk to course controllers and express ideas through the evaluation forms. Some mentioned the students association as a forum, complaining to Computer Services and talking to individual lecturers. Some students pointed out that although these avenues are available for influence and change, that it is the next years intake of students that may benefit. When asked what new IT services they would like as computing students, the respondents focused on web delivery, wireless connectivity and longer access.

The most common ideas for new IT services were:

- Web based enrolment and integrated results systems
- Wireless connectivity for students own laptops and devices
- Holiday access to computer rooms
- 24 hour access to IT facilities
- More focused tuition on specific software packages
- Rental of laptop computers
- More positive customer service from IT support staff

Students, even when posed with this open question for new suggestions, did not really view themselves as co-equal with internal staff users, but took a customer viewpoint,

requiring EIT to provide IT service. No particular strategy was raised, but rather a “wish-list” of additional IT services. Some students responded that they were quite happy to leave this type of decision-making to EIT and trusted EIT’s management to make these judgements.

Some comments from students when asked how they could influence IT services and policy at EIT:

“I believe I can make an impression by speaking up when given the opportunity such as surveys like this one and course evaluations etc.”

“Using the course/Tutor evaluations.”

“Comments to Tutors”.

Some comments from students when asked what new IT services they would like:

“Web-based enrolment and results”

“More friendly service staff and Helpdesk.”

“I’m quite happy to leave the decision-making to those who are more qualified. In my view EIT has a very balanced, well-rounded, caring and supportive IT teaching staff.”

“ 24 hour access to classrooms.”

INTERVIEWS

As part of the case study research methodology, interviews were undertaken with the CEO, the Corporate Services Manager, the Computer Services Manager and a number of other key users at EIT. The interviews were performed in the subject's offices with a set of paper-based written questions (Appendix A) that were given to the subjects a week before the interview.

CEO INTERVIEW

The CEO of EIT, Bruce Martin was well aware of the user group meetings with the corporate and Computer Services Managers. He was supportive of this liaison and believed these meetings to be essential for a shared vision for future IT planning.

When asked for his view on whether end-user computing should have more sway at EIT, Martin was cautious on this concept, as he tends to favour, generally, a centralised controlled approach. This centralised approach applies to other management functions too, such as marketing. He explains that a more centralised approach to functional areas allows some economies of scale and avoids wasteful use of resources. When Bruce Martin started at EIT in 1991, EIT was very de-centralised in many aspects. He has brought in a more centralised model of management.

The CEO plays two roles in his influence; one as providing the top oversight over IT and EIT governance, and two as a senior level user exerting influence as a senior management user. The CEO has opportunity to have input as a managerial user through the senior managers forum, a meeting of all senior managers at EIT that meets regularly.

He may also exert some influence in general exchanges with the Corporate Services Manager and other senior managers. However it appears that he does not initiate IT projects or act as a major sponsor to IT-led initiatives. The full interview is detailed in appendix A.

CORPORATE SERVICES MANAGER INTERVIEW

The Corporate Services Manager, Kerry Marshall, has traditionally been the architect behind most business led IT initiatives at EIT. Marshall found the Section / Information Technology consultation meetings that were part of the IT strategic planning process at EIT in 2001 very useful. He said that the meeting outcomes were variable for different groups and some meetings degenerated into a critique of current IT support rather than a focus on ideas for the future. As much of the focus was on operational and problem areas of IT rather than future possibilities, Marshall sensed that more input from user groups would be forthcoming when they had read the draft IT planning report. He believed this often occurs with user groups where ideas are more difficult to generate from a 'clean slate' approach as opposed to a situation when IT strategies are outlined and users invited to add their own or modify proposals.

As the Corporate Services Manager, he did not believe that the consultation process really slowed down the IT planning process because user involvement and ownership is critical to EIT's success. Also critical to EIT's success in the future is the formation of quality strategic IT plans which are aligned to EIT's business goals.

Marshall outlined how there is opportunity for other senior managers to have direct individual input into the IT planning report, so at any stage they can add or modify their sections consultation input. He saw the ISSP group as mainly involved in the implementation of the final IT planning document.

He believes that it is important for overall control of IT by a central manager or department, but that hopefully more control and responsibility can be devolved to the user groups. One of the management tools that Marshall uses as part of his oversight of IT is environmental scanning, but generally executes conventional conservative management, attempting to balance the many needs at EIT. The recent appointment of a new Computer Services Manager signals a commitment to a more strategically aware IT management approach.

COMPUTER SERVICES MANAGER INTERVIEW

The Computer Services Manager (2001), Herbert Halasz, felt that some users were unprepared for the IT consultation meetings. This could have been due to user managers not adequately preparing their staff or failing to meet internally before the IT consultation meeting.

Halasz is of the belief that users and user groups may have too much power at EIT and this can cause problems of high cost and complexity. When users are able to secure delivery decisions beyond the resources or control of the IT department then the Computer Services section becomes more an operations department than a business partner. One group that Computer Services has worked with quite successfully seems to be the disability awareness section with the advent of wireless networking provision for notebooks of disabled students and other innovations.

The Computer Services Manager reinforced a view from other users and results from the survey that IT is not represented directly at a senior-enough level. Given that in some companies the CIO is co-leading the company alongside the CEO, it is unusual for a Computer Services Manager to be reporting through several levels of management from Computer Services Manager to the Corporate Services Manager to the senior managers forum, and finally to the CEO. Does this signal that the IT function and management is valued less than the strategic plans of, say, a Faculty Manager?

His section uses a service level agreement as a specific benchmark for his computer section with a prioritised set of responses for various problems, such as a priority 1 (IT staff respond within 30 minutes) response for a failed server. Some examples of user groups developing for specialist needs include the Macintosh users group and the Blackboard group. The Blackboard group was formed to share knowledge and skills in using this integrated learning package. The Blackboard user group also helps set some strategy on how this Internet platform will change and benefit courses at EIT.

ARTENA GROUP

In addition to the 3 executive interviews, the researcher held an informal discussion with the most influential MIS user group. The Artena group meets regularly throughout the year to discuss refinements and issues for the student management system(Artena) at EIT. Artena is the single largest application system at EIT and probably the most strategic IT asset apart from the hardware/network infrastructure. The group feeds technical fixes and refinement requests to Mel England the Projects technician, who in turn liaises with the software company supplying Artena.

A major strategic plan is to enable Artena to run on a web platform and allow student access to enrol from the web and access more information direct from the system. There is also a need to integrate Artena into other sub-systems such as student results, finance and allow more staff direct access.

Senior managers at EIT have expressed a desire for an integrated database or at least an integration of the many different systems. Remenyi (1991) supports this type of globalisation aim referring to the downside of having many different IT systems within one organisation. This high aim could only be achieved if senior level users strongly lobbied for this integration and used their own user budgets as well as the central Computer Services budget.

The disparate systems are in some ways a reflection on the different sections and multiple aims at EIT. A pronounced division exists between administration services and the academic faculties with both groups viewing EIT quite differently. Central management tends toward control and financial strategies while faculties tend toward product (teaching and learning) improvement, which they feel, leads to quality improvements. A coordinated approach to strategic management will ultimately manifest itself in mutual corporate aims and systems to support this. An EUC / IT collusion may be the conduit for this to occur.

A SYNTHESIS OF THE CASE RESULTS

This case study investigating IT management and user influence on IT planning has examined results from several sources: interviews with managers, user groups and from two surveys. Data was also gathered from several reports, documentation and an ethnographical view of EIT as an organisation utilising information technology.

The case study has also scanned literature pertaining to strategic IT management, end-user computing developments and influence, and literature outlining other similar cases to EIT.

This conclusion of chapter 5 attempts to combine, synthesise and draw qualitative conclusions from the wide range of data and experiences. From the data and results of this case study, EIT appears to have a reasonably sound IT infrastructure, with a good level of user involvement and IT knowledge. Both users and IT management believe that IT strategy will be crucial for EIT's future success, but there are different viewpoints on the best way to pursue sound IT strategy.

Matrix of case data matching to findings

	History of IT at EIT	Staff Survey	Student Survey	CEO Interview	Corporate Interview	Computer Manager
IT pitched Too low in the organisation	evidence	evidence	No	revealed	No	Evidence
Increased involvement Needed by senior management	evidence	Increased Finance backing	No	No	No	Yes
User groups are involved in IT planning	evidence	Evidence (but some unaware	Some evidence	Yes	Yes	Limited
User groups want integration of data	Yes	Some evidence	No	Some evidence	Some evidence	Limited
IT is an integral part of EIT's strategy	Some evidence	Most staff recognised	Some evidence	Some evidence	Yes	Yes

(Figure 5: Case data Matrix for EIT)

This matrix identifies some of the research questions and shows whether the data from the case study supports these research assertions.

The assertion that “user groups are involved in IT planning” appears to gain the most positive support from all sources.

CHAPTER 6

RECOMMENDATIONS FOR MANAGEMENT, IT MANAGEMENT AND FURTHER RESEARCH

This final chapter presents recommendations for professional practice and further research.

The recommendations are made on the assumption that the examination of the EIT case may be transferable to other organisations, especially other Universities and Polytechnics, wishing to harness the planning powers of end-user computing together with corporate strategic IT planning.

RECOMMENDATIONS TO MANAGEMENT

From the literature surveyed, the experiences of this case and the survey results it is clear that some of the difficulty in setting strategy for an IT department lies in the positioning of the section itself. If the IT section is to be used purely as an operational support vehicle then strategy will need to be set by other managers and departments. If however, a fully functional IT department is envisaged then it must fully participate in the highest level of strategic planning, and be able to establish dialogue with user groups as an equal business partner rather than exist as an “operational clip-on”.

The leader of IT should report directly to the CEO, and participate in senior managerial planning sessions. Foster et al (1999) confirm the need for the IT leadership to be represented at the highest level in an organisation. The charter for EIT's Computer Services should broaden wider than efficiently manage the current set of IT resources. The charter should also include the interpretation of the mission and general strategic goals and how IT will support these (Kobulnicky, 1999).

It is clear from recent examples in the literature and the business press that success with IT-led strategies is more certain with top management support. Chatterjee (2001) points out that many firms are appointing the Chief Information Officer as a top level manager with one of the highest level of responsibilities across the company. In some cases this CIO co-leads the organisation with the CEO.

Non-IT senior management can no longer leave all IT strategy and political support to the IT organisation but must actively lead the selling process throughout the organisation. For example, a CEO-led IT strategy such as Blackboard at EIT has far more chance of success than a Computer Services Manager-led network infrastructure change because of the greater influence exerted. Pressure from the user community then is not solely directed at the IT section but is persuaded by other functional areas.

This wider responsibility is supported from the literature review, with the responsibility for strategy setting firmly in senior managements court (Badowy, 1998).

Graves (1998) also confirms this need for a wider level of involvement, stating that the IT function is no longer just a matter of central purchasing and deploying technology, but that much of the responsibility for technology planning lies outside the Computer Services section. The strategic planning should be developed and funded by the leaders of all the important business units.

While it is advantageous to allow and encourage end-user participation in the long term planning of IT, there is some evidence from this study that a clearer setting of boundaries between the responsibilities of the Computer Services section and the user community. The Computer Services Manager revealed in his interview that end-users might have more power than they realise, causing friction and inconsistencies across the organisation. In addition, the user community made comments through the survey that the IT planning process is not clear to them.

Whether or not EUC gains more influence at EIT, clarity needs to increase over the demarcation in support issues, planning input, and alignment of educational goals and IT

strategy. In some instances, educational goals are being raised and set by reports stemming from Corporate Services and the Computer Services sections. The question here is; should a non-educational management team set educational strategic goals? In other evidence from the case, users had an expectation that they would set a large-scale financial investment in IT. Once again, is this realistic or within the responsibilities of educational management? Niederman (1990) raised this issue of ongoing tension between user groups and the IT function and supported the need for consensus and clear boundary lines for useful dialogue and planning to occur.

Day and Shoemaker (2000) also list “maintaining organisational separation” as a main criteria for deploying emerging technologies for successful strategic use by organisations. This not only applies to EUC and IT management but also to allow the separation from the stifling risk-avoidance that sets in to any internal bureaucracy to resist change and development.

RECOMMENDATIONS TO IT MANAGEMENT

Recommendations are made to practitioners about the professional practice value of using strategic planning as a dynamic and engaging process to help manage through changing times. These recommendations are based on the conclusions drawn from the EIT case in relation to the research questions and the findings in respect to the parallel development of strategic planning alongside end-user computing involvement,

Based on the EIT case, a strategic planning process involving end-users was used to not only define where IT development was at a point in time, but also to reflect the aspirations and ideas of computer user groups throughout the organisation. This valuable and dynamic process helps to manage the diffusion and uptake of IT through the organisation without autocratic control or laissez-faire IT management.

From this it is recommended that IT managers, especially tertiary IT leaders, view IT strategic planning as a dynamic and engaging process covering several dimensions. In this context strategic planning is used to define a future desired state as well as to increase responsiveness and satisfy the growing and complex demands and needs of end-user computing groups represented throughout the organisation. This approach takes IT staff focus away from the technical aspects of the process and helps focus energy on creating the future desired state and helps to develop enthusiasm and to embrace change positively.

This approach offers the potential to bring a new vitality and purpose to IT strategic planning within IT departments, helping to bring computer sections in closer partnership with faculties and staff departments in Polytechnics and Universities. The dual mode IT strategic planning – EUC model recognises that strategic planning is a process through which it is possible to develop a shared vision for the future of professional practice in IT planning and support, and further that the process can be used to bring about real cultural change within IT departments and within organisations. A strategic planning process

involving end-users offers a way for IT staff to engage at all levels of the organisation and transform the influence and positioning of this functional area.

From discussions with IT teachers, students and the academic technician (who is not part of the Computer Services team), the provision of two unstructured computer labs has been a resounding success for users, student satisfaction and IT teaching staff satisfaction. These “labs” consist of a hardware lab with assorted PC’s that can be disassembled and reconstructed, and a software lab where operating systems and networking systems can be installed and configured by the students. This smaller example of almost fully devolved end-user computing would suggest that in some areas “creative chaos” may be better (and more customer focused) than well controlled but stifled IT services.

This small example of two computer labs for students being fully supported by the user group, that is the IT teaching department, could be extended to all computer classrooms. This would require a further devolving of responsibility from Computer Services, to the IT teaching section. Computer Services could setup the File servers as they integrate into the EIT overall network, while the IT section could setup the PC desktop environment and increase their own technician from one staff member to two or more.

Student satisfaction would be likely to increase as support calls from students can be dealt with by purpose driven technicians with a single aim of classroom computer support. This devolved model of student computing would need to be agreed upon by the IT teaching section, and senior management of EIT would need to sanction the growth of a technical support team. Some technical duties may need to be added to IT lecturing staff in terms of desktop and software installation and repair. Most IT lecturing staff would relish the prospect of gaining hands-on experience with systems support, which would further enhance their teaching.

The downside with this user-supported model of computer classrooms may be a less robust system and a less secure environment. Trust would need to be established between

the IT teaching section and the Computer Services department. Like all creative and customer focused strategies, this model may be “messier” and less standardised but has great potential for a creative and dynamic environment for students and staff. Other Faculties which use the computer rooms may also be affected with less official support than the current centralised model.

There is an opportunity for a “think tank” at EIT particularly between Computer Services staff and IT lecturing staff to investigate new technologies, software and communications. This would also have the effect of getting users (academic staff) together with IT department staff for some common goals. There are many skill sets underutilised for EIT amongst academic staff (apart from the academic delivery) and staff in the IT department would welcome the opportunity to experiment and research new technology without the pressure of immediate support issues.

EIT could move in this direction of incorporating student users by providing smaller, semi-private “wired” workspaces for senior 3rd year students. Another initiative to allow student users to influence IT planning would be to form a computing students forum for generating ideas for consideration.

RECOMMENDATIONS TO THE END-USER COMMUNITY

From this case, it is clear that end-users and end-user management share some responsibilities in the successful strategic planning of information technology systems. End-users must be willing to participate in planning sessions, and to establish healthy relationships with the IT leadership and IT personnel.

End-users may establish IT leadership by assuming responsibility for the project management of specific IT systems planned for development. IT Project managers who are also End-user managers are well positioned for insight into the needs of the users where the system is to be implemented. These end-users also have a vested interest in ensuring that the proposed IT system is successful rather than waiting passively for the IT department to deliver the system.

End-users and their managers must be willing to enter into positive dialogue with IT management and senior management without the dialogue degenerating into criticism of operational and support issues. This EIT case study illustrated how readily end-users will raise operational IT aspects without putting enough thought into longer term, strategic planning of IT in relationship to their mission and business strategy.

Training should be pursued by the end-user community without over dependency on the internal IT organisation. This training should also include business management training which can help end-users enter into informed discussion of longer term IT planning. This case illustrated that IT management depends on the user community being aware and educated about IT technology that is available and that could be utilised by their organisation.

If end-users can grow from a passive dependency on the IT department and assume some IT responsibilities including obtaining training and taking on IT project management functions then EUC – IT management strategic information systems planning can be more successful.

RECOMMENDATIONS FOR FURTHER RESEARCH

This study focussed on the IT function in tertiary organisations through an examination of one single case.

Further research on this topic of EUC-influenced IT strategic planning could cover a wider sampling by investigating several cases, and then performing some benchmarking to ascertain how influenced their IT planning process was, and then to see if this had a bearing of the success of the IT planning.

Interviews could be conducted with key personnel at several Universities and Polytechnics, and other tertiary providers.

FINAL CONCLUSION AND COMMENTS

This study has told the story of how EUC has influenced the development of IT management planning at EIT. The experience of EIT planning was reported, examined and analysed against the research questions and using the dual framework of EUC and IS strategic planning which emerged from the literature reviewed.

As a wide-ranging case study it serves to highlight the depth of organisational complexities and the many influences on IT planning in a modern organisation. The case study at EIT allows viewpoints from the user communities and the IT authorities and exposes the underlying tension between the two organisational approaches to IT management.

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APPENDICES

APPENDIX A: INTERVIEWS

CEO INTERVIEW RECORDED

Chief Executive Officer: Mr Bruce Martin

Question 1. Faculty liaison meetings with the Computer Services Manager and Corporate Services Manager have been held over the last 3 months. Do you see this development as a positive influence on IT planning?

Yes and essential. CEO input into the overall Strategic plan, Managers Forum discussion.

2. Is there an opportunity for senior Managers (CEO, Academic Manager etc) to have direct individual input into the planning of IT for the future?

Yes, individually to Kerry (Corp. Services Manager). Or Senior Managers Forum.

3. What is your own view on whether user-input/ End User Computing/ User influence should have more sway at EIT. Or even User groups controlling their own destiny?

Tends to favour a centralised controlled approach. This applies to other management functions too. Looking for “economies of scale”. Too much EUC may equate to wasteful use of resources.

When Bruce Martin CEO started at EIT in 91, EIT was very de-centralised in many aspects. He has brought in a more centralised model of management.

4. Do you use any “models” of management or IT management to help you manage or oversee IT?

Strong Growth model. Alignment of overall strategy to IT strategy. Benchmarking important.

5. Where do you see IT Management and EUC in the future at EIT?

Users need to take more responsibility for training and minor problems etc.

6. Do you have any special projects/ideas for IT that you would like to see develop?

Has limited IT skills (email and Word) . Flexible Learning into the future.

CORPORATE SERVICES MANAGER INTERVIEW RECORDED

Corporate Services Manager: Mr Kerry Marshall

Corporate Services Manager is responsible for: Facilities Management, Financial and Computing Services.

1. Can you summarise the faculty liaison meetings held over the last 3 months?

a) How useful were the meetings?

Very useful for general feedback. [See new IT Plan]. Meetings were variable.

Groups included:

ISSP Group

Faculty of Arts and Social Sciences

Faculty of Business Studies

Faculty of Maori Studies

Faculty of Science and Technology

Education Services section

Computer Services Section

All "Other" Service sections

Business Studies Advisory Group

b) Have these meetings influenced (or about to influence) the Strategic IT plan?

Yes. However much focus was on operational and problem areas of IT rather than future possibilities.

The new IT Plan should initiate some more input from user groups once they read the draft.

c) Does this liaison slow the planning process down?

Not really because it was (is) critical to the success of IT and future.

2. Is there an opportunity for senior Managers (CEO, Academic Manager etc) to have direct individual input?

Yes, through the Seniors Managers Forum. Or individually, probably to the Corporate Services Manager.

3. Who is in the IT Planning group?

Are they representatives for their areas? Or selected on their individual ability?

This is the ISSP group (IT Teaching Section Manager, Computer Services Manager, Another Faculty Dean, Admin Supervisor).

Selected on a balance of levels and areas.

This group should be more involved in the Implementation of the new plan.

A number of CSF's needed to consider in new IT Plan.

4. What is your own view on whether user-input/ End User Computing/ User influence should have more sway at EIT. Or even User groups controlling their own destiny?

Important: Need for overall control, but hopefully more control and responsibility to the user.

5. Do you use any "models" of management or IT management to help you manage or oversee IT?

Organisational Scanning, generally conventional overall management – balancing many different needs at EIT.

6. Where do you see IT Management and EUC in the future at EIT?

New position of Computer Services Manager (current manager renamed "Network Manager") should be more strategic and more management orientated.

COMPUTER SERVICES MANAGER INTERVIEW RECORDED

1. Can you summarise the faculty liaison meetings held over the last 3 months?

a) How useful were the meetings?

There was some variability in terms of user group's preparation before the meeting, and topics discussed did not really cover future strategic planning in depth. A lot of time was spent on support issues, given that recently before many of the meetings the network had some problems. The network itself seemed to be the focus.

b) Have these meetings influenced (or about to influence) the Strategic IT plan?

Hopefully, yes.

c) Does this liaison slow the planning process down?

IT has taken quite a bit of time to meet with all Faculties and departments at EIT

2. Is there an opportunity for Senior Managers (CEO, Academic Manager etc) to have direct individual input?

They can talk to myself (Computer Services Manager), or to Kerry (Corporate Services Manager) or raise issues at the senior managers forum. Often they may be working through their own department's plans etc.

3. Who is in the IT Planning group?

Are they representatives for their areas? Or selected on their individual ability?

This is the ISSP group (IT Teaching Section Manager, Computer Services Manager, Another Faculty Dean, Admin Supervisor).

4. What is your own view on whether user-input/ End User Computing/ User influence should have more sway at EIT? Or even User groups controlling their own destiny?

Users have too much power and influence at EIT, which results in un-integrated and un-supportable systems.

5. Do you use any “models” of management or IT management to help you manage or oversee IT?

Use a Service Level Agreement (SLA) to monitor network access and availability.
Focused on the File Servers, Network Infrastructure and user support.

6. Where do you see IT Management and EUC in the future at EIT?

New position of Computer Services Manager (current manager renamed “Network Manager”) hopefully should split the roles of technical oversight and direction and the more business strategic issues dealt with. I feel I have been attempting to do 2 or 3 roles in the same position.

APPENDIX B: SURVEY INSTRUMENTS

STAFF SURVEY

The following is the “text-only” version of the staff survey form.
The actual published survey was constructed with Infopoll Designer and published directly on the Internet, with advanced formatting and graphics.

Staff Survey – Full Questionnaire

User Input into Information Technology Planning at EIT

My name is David Skelton and I am an Information Technology Lecturer in the Faculty of Business at EIT Hawke's Bay. I am seeking volunteers to take part in my research project. This project is being supervised by Peter Blakey at Massey University in fulfilment of my Masters in Information Systems.

My contact details are: [REDACTED]

Purpose of the Study

The purpose of the study is to find out what level of input staff and sections have into the strategic planning of Information Technology at EIT.
The survey is not focused on general day-to-day IT support.

What would I like you to do

Complete the attached questionnaire and return it by 14th December 2001. The questionnaire will take approximately 10 minutes to complete.

What are your rights as a participant?

- to decline to participate - participation is completely voluntary
 - to have your anonymity and confidentiality protected
 - to refuse to answer any particular questions
 - to withdraw from the survey at any time
 - to ask any questions about the study at any time during participation
 - if you request it, to be given a summary of the findings when the research is completed.
- My final report will be lodged in the EIT Twist Library on completion.

It is assumed that by filling in the questionnaire you consent to taking part in the research.

This questionnaire is available in both electronic and paper-based formats. Please choose one of these formats and respond once only.

SECTION I

Information Technology Planning

1.1 Has your section or faculty met with IT / Corporate Services regarding strategic IT planning?

☐ Yes

☐ No

1.2 Has your section met independently to establish your own IT needs and goals?

☐ Yes

☐ No

1.3 How would you rate yourself as an IT user? [Tick one box only]

☐ Computer User with excellent skills

☐ Competent Computer User

☐ Intermittent Computer User

☐ Seldom use a PC

1.4 What is your influence on computing at EIT?

☐ Position of responsibility with good IT knowledge

☐ Position of responsibility with average IT knowledge

☐ Limited responsibility with good IT knowledge

☐ Limited responsibility with average IT knowledge

1.5 Rate your level of agreement with each of the following statements.

A) Information Technology will have a major influence on EIT's success in the future

☐ Strongly disagree

☐ Disagree

☐ Neutral

☐ Agree

☐ Strongly Agree

B) EIT is on track for strategic use of IT

☐ Strongly disagree

☐ Disagree

☐ Neutral

☐ Agree

☐ Strongly Agree

C) The EIT Computer Services department is my sections "technology partner" in IT planning

☐ Strongly disagree

☐ Disagree

☐ Neutral

- ☐ Agree
- ☐ Strongly Agree

D) Computer Services helps my section establish strategic IT goals

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

E) IT Planning is best left to the IT Department

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

1.6 Have you read the Corporate Services White Paper on IT planning (2001)?

- ☐ Yes
- ☐ No
- ☐ Not aware of this document

1.7 Do you believe IT management at EIT is represented at a high enough level?

- ☐ Yes
- ☐ No

1.8 Rate each of these groups or office-holders on their influence on IT Planning at EIT.

A) User Groups

- ☐ No influence
- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

B) CEO

- ☐ No influence
- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

C) Corporate Services Manager

- ☐ No influence

- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

D) Computer Services Manager

- ☐ No influence
- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

E) EIT Council

- ☐ No influence
- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

F) My Section Manager

- ☐ No influence
- ☐ Low influence
- ☐ Average level of influence
- ☐ Increasing influence
- ☐ Big influence

1.9 Whose responsibility do you think it is to set long-range IT plans for EIT?

- ☐ CEO
- ☐ Computer Services Manager
- ☐ Other Senior Managers
- ☐ Sections/Faculties themselves

1.10 When you need technical advice on important planning issues for your section, who advises you?

- ☐ Your manager
- ☐ Computer Services Manager
- ☐ Computer Services staff
- ☐ An outside company
- ☐ Your own section staff

1.11 What Strategic IT goals are your department working on at the moment? E.g. Blackboard development for Internet based teaching.

...

1.12 Please add any other insights into IT Planning and End-User Computing at EIT you may have.

STUDENT SURVEY

The following is the “text-only” version of the student survey form.
The actual published survey was constructed with Infopoll Designer and published directly on the Internet, with advanced formatting and graphics.

EIT Computer Student Survey

Thank you for taking time to complete this form. You will be able to see the live survey results as soon as you submit this survey.

GENERAL INFORMATION

1.1 How would you rate the computer classroom IT equipment?

A) Computers

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very Good
- ☐ Excellent

B) Software

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very Good
- ☐ Excellent

1.2 How would you rate the level of IT service to you as a student?

A) Computer Services

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very Good
- ☐ Excellent

B) IT Teaching department

- ☐ Poor
- ☐ Fair
- ☐ Good

- ☐ Very Good
- ☐ Excellent

1.3 How would you rate your level of computing skills and knowledge?

A) PC Skills

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very Good
- ☐ Excellent

B) IT general knowledge

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very Good
- ☐ Excellent

1.4 Do you believe you are able to influence IT policy or services at EIT?

- ☐ Yes
- ☐ No

1.5 Have you used the course/Tutor evaluations to comment on IT services?

- ☐ Yes
- ☐ No

1.6 Who do you believe should set the IT plans for student computing?

- ☐ The Computer Services Department
- ☐ The IT Teaching Department

1.7 As a User at EIT, how could you influence IT services and policy at EIT?

...

...

...

1.8 What new IT services would you like as a student at EIT?

...

...

...

DEMOGRAPHIC INFORMATION

2.1 What is your gender?

- ☐ Male
- ☐ Female

2.2 What is your age?

- ☐ 18 or under
- ☐ 19-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 or more

2.3 What was the highest level of education you have completed?

- ☐ Master Degree
- ☐ Bachelor Degree
- ☐ Graduated Polytechnic or University
- ☐ Attended Polytechnic or University
- ☐ Graduated high school
- ☐ 6th Form or less
- ☐ Attended high school
- ☐ Other