“PLUS C’EST LA MÊME CHOSE”:
UNIVERSITY FACULTY’S PERCEPTIONS
OF LEARNING TECHNOLOGIES

By

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ABSTRACT

The purpose of this research was to investigate faculty members' perceptions of and experience with using learning technologies in their teaching. A literature review indicated that a diffusion of innovation model was an appropriate framework for the analysis of the data, as it invites analysis of a variety of factors that contribute to or detract from adoption of an innovation. The study invited participation from a group of faculty members whose research interests are diverse. Twenty semi-structured interviews and subsequent analysis revealed that (a) most faculty members are already making significant use of technology in their communications with students and colleagues, (b) learning technology makes possible educational projects that were not possible before, (c) using learning technology in teaching requires reconceptualizing the instructor’s role, (d) funding structures, support structures, and workload issues are key and significant disincentives for faculty members in adopting and using learning technologies. The results of this study have implications for resource allocation and faculty development planning.
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CHAPTER 1: OVERVIEW AND BACKGROUND

Introduction

The recent report of the Pan-Canadian Advisory Committee on On-Line Learning, The E-Learning E-volution, summarizes one view of the future of learning: access to education and training using technology is the way of the future internationally, and institutions who fail to embrace its potential now will be left behind. It offers, as one possibility, a scenario in which some percentage of traditional educational institutions become redundant, leaving their student populations to be served by younger, more technologically sophisticated institutions. It argues that the new knowledge-based world economy of the 21st century is unlikely to follow the lead of institutions whose policies and pedagogy are institutionally centered: it postulates that the future favours student-centered, flexible learning options that employ educational technology to ensure that curriculum is available for students to access at convenient times and in an asynchronous format. This model challenges traditional institutions and their faculty to accept and embrace the potential offered by educational technology, and to use it wisely and well.

In his 1992 book Technopoly: The Surrender of Culture to Technology, Neil Postman argues for a rather more conservative approach to adopting and incorporating new technologies into our lives and educational institutions. He argues that throughout history, new technologies have provided "both a burden and a blessing: not either-or, but this-and-that" (Postman, 1993, p. 5), and that while new technologies introduce new potential and new opportunities, they also tend to result in changes to social structures
and institutions. Particularly in reference to the use of computers in education, Postman argues that "we need to know in what ways it is altering our conception of learning, and how... it undermines the old idea of school." (Postman, 1993, p. 19) His arguments are not put forward to discourage innovators from making new and creative uses of technology, but rather to encourage educators to make thoughtful and considered uses of technology in education.

**Learning Technology Defined**

"Learning technology" is a term that may tend to lend itself to misinterpretation or misunderstanding when discussions and debates about the merits of its inclusion in the teaching and learning process are enjoined. Emerging from its roots in distance education, educational media and instructional technology, the definition of learning technology is subject to the elements described by Verduin & Clark (1991); namely, that it is influenced by an educational organization, uses educational media to unite the teacher and learners, carries course content, and provides two-way communication between teacher, tutor or educational agency, and the learner. Variously described as "a complex integrated process involving people, procedures, ideas, devices and organization, for analyzing problems" (Garrison, 1989, p. 42), "the tool that helps one learn and thus enables learning through technology" (Bruce, 2001, p. 730), and the "newer forms of technology characterized especially by electronic telecommunications and digital imaging (e.g., computer-assisted learning, video-assisted learning)" (UBC, 2001, p. 4), learning technologies offer the potential for enriching learning while offering flexibility in scheduling. The definitions offered clearly support the concept that
"technology" is a form of interface that allows learners to seek out and evaluate information from resources that lie beyond the physical boundaries of the University campus, and to discuss ideas and concepts without the constraint of classroom walls.

**Background**

The Distance Education and Technology (DE&T) unit of The University of British Columbia (UBC) brings instructional designers and faculty members together to work through questions of which learning technologies to employ in the creation of distance education curriculum. The instructional designers work with faculty members as they use the technologies in support of their students, and Learner Support staff work with students as they adapt their learning practices to the demands of the chosen technologies. In the DE&T experience, individual faculty members who opt to develop full distance education versions of their curriculum tend to come to the course development process with a belief in, or curiosity about, the applicability of learning technology in their teaching, and they are faced with pragmatic challenges related to managing both expectations and technical support for themselves and their students. Technology and personal management issues have long been factors in curriculum development and delivery in the distance education paradigm, and it is rapidly becoming evident that these questions are increasingly being confronted in the traditional, face-to-face instructional model as new learning technologies are developed and used with greater regularity.

In the summer of 2001, I attended several workshops as part of the UBC "TAG Summer Institute", a series of professional development workshops for faculty members
sponsored by the Teaching and Academic Growth unit at UBC. The workshops on the
subject of learning technologies posed and addressed such questions as "How do we want
to teach using technology?", and "How much should faculty know about technology?"
The questions raised in these workshops ranged from the fairly general to the very
specific, and started me wondering about how faculty members view learning technology
in relation to their own teaching and what use faculty members are actually making of
learning technologies at present.

These issues are not new in the field of higher education, nor are they new
questions at UBC. Like other traditional Canadian higher education institutions, UBC is
coming to grips with the organizational self-examination that technological changes
demand. Debate has ensued about ways and means to retain the quality and high
standards that have made UBC one of the top Canadian universities while embracing and
exploiting the potential of technology to support teaching and learning. The appointment
of a new President in 1997 marked the beginning of a shift in the way the University
community views itself and the way it represents itself to the larger community. The
new, informal slogan, "Think About It", began the process of re-viewing and re-visioning
the institution and its mandates.

Two significant documents resulted from the re-view and re-vision exercises:
TREK 2000 and the Academic Plan. These documents, created through broad
consultation with the University community, articulated the new vision for the University
and formed the basis of the planning process needed prior to implement the changes.
TREK 2000 identifies five key "pillars" which will support the envisioned changes and
resulting revitalized institution; People, Learning, Research, Community and
Internationalization. These key pillars speak clearly to the importance of people in the future success of UBC as a university community of the 21st century. Yet subsequent discussions among senior management in the University have identified the need for a “cross-pillar infrastructure” in the areas of Human Resources, Financial Information Management, and Information Technology. The addition of these “cross-pillar” supports has clearly been developed in recognition of the ubiquitous presence of technology within both the institutional and larger cultural structure.

The University’s Academic Committee on the Creative Use of Learning Technology (ACCULT) has produced two discussion papers on the subject of the use of learning technologies at the University. The December 2001 discussion paper, titled Advancing the Creative Use of Learning Technology, encourages consideration of electronic or computer-based learning technologies as a means to increase learning enrichment and flexibility, while the committee’s November 2000 discussion paper, titled The Creative Use of Learning Technologies: A Discussion Paper, identifies community erosion, devaluation of traditional learning methods, and “Faceless U.” as pitfalls to be avoided in the adoption and use of learning technologies. Primary among these issues, for the purposes of this research, is the acknowledgement that many instructional faculty members “are skilled orators who deliver superb lectures or seminars using traditional learning methods. This set of skills must be valued and the new e-learning fashion must not be allowed to push the importance of good traditional teaching to the background.” (UBC, 2000, p. 21). The paper continues its acknowledgement of the value of traditional face-to-face learning methods, indicating the concern that apathy and alienation undermine learning, and anything that acted to disengage students from learning must be avoided. Learning, student development, and
scholarly communication are enhanced by a strong face-to-face presence and this must not be reduced. Personal contact between faculty, staff, and students is an essential ingredient in learning and this rich form of interaction must not be subverted by learning technology. Used well, learning technology enhances communication and interaction within the university community, but it cannot replace or in any way dilute personal contact among us. (UBC, 2000, p. 21)

Thus, the University’s discussion papers advocate both an increase in the use of computer-based technologies and preservation of the traditional face-to-face learning technologies in a balance that puts efficacy of both learning and teaching in the forefront, respecting the faculty member's interpretation of what constitutes the best balance for their specific curriculum.

Many questions are raised by even a brief examination of the UBC situation and the literature on the adoption and use of learning technology. What is of particular interest in this research, however, is an examination of what may have been missed from the ACCULT committee and similar reports. The research undertaken in preparation of the Creative Use of Learning Technologies report involved consultations with faculty, staff and students from all twelve faculties in the University through a series of workshops. These workshops were designed to develop an understanding of the extent and manner in which faculty members want to use learning technologies within the foreseeable future. The workshop process was important in moving the learning technology agenda forward within the University community, as it allowed those faculty, staff and students who are interested in the questions to voice their opinions. However, these workshops garnered participation by only 185, or 2%, of the University’s approximately 9,079 full-time faculty and staff (UBC Facts and Figures, 2001). The workshop process, as described in the ACCULT report, involved a preliminary discussion of the Faculty’s current teaching and learning strategies, followed by a
demonstration of several applications of learning technology being used within the Faculty. Participants then broke into discussion groups, and developed scenarios that described the desired approach to teaching and learning that the group could envisage being possible in five years’ time. As part of this scenario, the groups were asked to identify where learning technologies would fit within that vision. The process resulted in a broad range of visions and identified a wide range of concerns about the adoption and incorporation of learning technologies, but it remains reflective of the perspectives of a relatively small proportion of the University community, and open to criticism as having attracted and involved only those faculty members most interested in using technology to support their students’ learning. While the feedback provided was highly informative and useful, it is representative of only a small percentage of the faculty community. Given UBC’s articulated intent to encourage and support the use of learning technologies in the University community, it seems timely to investigate further both the current status of faculty adoption of learning technologies, the rate of learning technologies diffusion, and to articulate the range of barriers to faculty adoption of learning technologies.

**Research Question**

The literature in this area is broadly based and fugitive: developing an understanding of the issues at stake requires investigation into the culture of the institution, and the culture of learning technology itself. The role of faculty members in the academy, their epistemology and pedagogy, and the changes to the roles of both faculty members and students bear examination. Rather than focusing directly on the factors that will tend to support or mitigate against adoption and use of learning
technology, the literature tends to address a single factor at a time. This study brings this literature together and focuses it on the issues that may currently remain as unarticulated concerns for faculty members who have not contributed to discussions about the adoption and use of learning technology in teaching.

This study looked to a discrete group of participants who were likely to hold a broad range of opinions and perspectives on the topic of learning technology, and invited them to express their perspectives frankly and openly. As the initial ACCULT consultation meetings were limited in both size and scope, and seemed to attract participants with a pro-innovation bias, it appears unlikely that faculty members who hold dissenting views or who are critical of the use of learning technology in teaching would have participated in those initial consultations. This research, then, intends to investigate faculty members’ perceptions of, and experience with, learning technology. During this process, I will identify both the factors that tend to encourage faculty members to adopt and use learning technologies and the barriers that they perceive as preventing them from making use of the range of available learning technologies in their instruction.

Information was gathered through twenty semi-structured in-person interviews with faculty members in the Faculty of Education that focused the participant’s attention on their own teaching experience, and led them to consider the elements of that experience that made it rewarding. From that point, participants were invited to consider what role learning technology played, or might have played, in that experience, what kinds of supports or impediments they had experienced in adopting or using learning technology, and their level of personal experience with learning technology. The semi-
structured format of the interviews encouraged participants to explore the questions in as much depth as they wished. The interviews lasted between 45 and 60 minutes, and were audiotaped and transcribed. The data was analyzed in accordance with the diffusion research model.
CHAPTER 2: LITERATURE REVIEW

Introduction

Contemporary terminologies used to describe technology-enhanced learning activities are many and varied, and may include Computer-Mediated Communication [CMC] (Harasim et al, 1998, p. 3), Computer-Assisted Instruction [CAI] (Bruce, 2001), and Web-Based Instruction [WBI] (Daugherty & Funke, 1998, p. 22), or be described in relation to learning networks (Harasim et al, 1998, p. 23; Haughey & Anderson, 1998, p. 3). Yet, the concepts that inform the various terms are remarkably similar; each term describes a learning environment in which learners, instructors and subject matter are connected to one another and to the larger world using a combination of networked computer-based communication systems such as bulletin boards, electronic mail systems, computer conferencing, the World Wide Web (Harasim et al, 1998, p. 24; Haughey & Anderson, 1998, p. 5; UBC, 2000, p. 14) and face-to-face meetings. Some descriptions also discuss the peculiarities of computer-based communication systems such as multimedia resources and simulations that allow educators to leverage the unique elements of digital technology to enhance their students' learning (Oblinger & Maruyama, 1996, p. 4-6; UBC, 2000, p. 7-9), while others advocate combining the strengths of both the traditional, face-to-face educational experience and the technology-based one by using technology when it is appropriate and when it will enhance the students' learning experiences (Creighton & Buchanan, 2001, p. 12; Fletcher & Patrick, 1999, p. 26; MacKinnon, 2002, p. 59; Khodarahmi, 1999, p. 16; Young, 2002, p. 33).
History of Learning Technology

The phenomenon we now refer to as "learning technology" has a long history, rooted in the development and applications of technology-based solutions for educational problems. Indeed, what is now referred to as "learning technology" has its roots in the literature about distance education: Verduin & Clark (1991) articulated four defining elements of distance education, three of which are applicable to the discussion of learning technology. The three elements that apply to learning technology are that this phenomenon is under the influence of an educational organization, uses educational media to carry course content and unite learners and instructors, and provides two-way communication between teacher, tutor or educational agency, and the learner (Verduin & Clark, 1991, p. 11).

The first educational problems that were solved by technology were those related to ready access to the centers of higher education. The development of the postal mail system in the 1800s made correspondence education, a system in which two-way communication between learner and instructor was supported, possible. Students were sent printed materials such as textbooks and self-study materials, and were given assignments to complete and send in to the instructor for grading (Bourdeau & Bates, 1996, p. 267). The graded assignments were then returned to the students by postal mail, and the students completed the assigned curriculum.

When radio became available in the early 1900s, it was used to deliver information to large numbers of people. As radio is a one-way medium, it was supported by telephone and the postal service to add two-way, individual-based interactions to the learning process (Bourdeau & Bates, 1996, p. 267). The development and increasing
availability of television in the 1950s supplanted radio as the one-way medium for delivery of information to large numbers of learners, still supported by postal or telephone service, or by access to face-to-face study centers (Bourdeau & Bates, 1996, p. 267).

The 1970s introduced computer and information technologies to education, increasing access to education by adding videoconference applications to the two-way media options available to support distant learners. The most recent development in this technological evolution is the availability of digital technologies that permit integration of telecommunications and information technologies in networks. This integration creates dynamic two-way communication using audio-graphics, interactive TV, digital desktop videoconferencing, and real-time transmission and dynamic interaction through broadband videoconferencing (Bourdeau & Bates, 1996, p. 268). These educational applications of emerging media provide interconnectivity and versatility to learners, and gives them access to conferences, courses, information data bases, learning groups and bulletin boards related to their area of interest (Verduin & Clark, 1991, p. 204-5).

The emerging and rapidly developing interactive telecommunications technologies hold promise to accommodate teaching and learning pedagogies that will develop advanced skills and abilities in students (Hall, 1987, p. 49). These developments will both provide increased and varied access to the ever-expanding information matrix (Garrison, 1989, p. 41) and challenge faculty members to conceptualize these technologies as an adjunct to the traditional instructional process (Verduin & Clark, 1991, p. 209). In responding to this challenge, it is important to bear in mind that media differ in the extent to which they can represent different kinds of knowledge (Bourdeau &
Bates, 1996, p. 278), and that the use of learning technology to manage the vast array of information now available will eventually transform the structure of the education transaction (Garrison, 1989, p. 41).

Learning technology has the potential to exert significant, and occasionally unpredictable, effects on the interactions and relationships that are at the heart of the educational exchange. Regardless of the medium of exchange, interactions between teacher and student, student and student, and scholar and source in the quest for development of deeper understandings will continue to be the foundation of the learning experience. Traditional instructional methods, such as lectures, have tended to develop and perpetuate a model of education in which the student’s learning is understood to be a direct result of the effectiveness of the instructor: instructors instruct and, as a direct result, learners learn. This model of higher education has historically been accepted as the most effective method for developing educated students and continuing the traditions of higher education. However, as each new technological development emerges, it is explored and exploited by educators seeking to make education more available, accessible and effective for students and alters, slightly or significantly, those educational interactions.

The definition of learning technology as “the tool that helps one learn and thus enables learning through technology” (Bruce, 2001, p. 730) respects the history of technological innovations as they have been applied to education, and opens the door to consideration of the range of learning technology tools, from “low-tech” tools like blackboard and chalk, to “high-tech” tools like the computer conferencing systems that are currently available and in use by educators. Indeed, many learning technologies are
ubiquitous and are used so often that they may even form an internalized part of the faculty member’s concept of their teaching (Gillette, 1999, p. 22).

**Innovation Diffusion Model**

The variables that affect the likelihood that learning technology will be adopted and used in teaching and learning are many and varied, and a framework or model that will facilitate analysis of these many variables lead to innovation diffusion research. Diffusion research seeks to understand the communication processes through which participants create and share information with one another to reach a mutual understanding (Rogers, 1995, p. xvi), and explores the factors that influence the adoption of innovations. Many factors affect the likelihood that a change will be adopted, particularly in a culture that is as multivariate as an institution of higher education; the presence of formal change agents in the organizational structure is significant, as their presence is a public statement of the institution’s commitment to change. The mix of faculty members, from those prepared to use learning technology innovatively in their teaching to those who are reluctant to change, is also a significant variable. An informal network of individuals who are committed on a personal level to using learning technology, and who can act as a model and informal resource to more reluctant members also has a positive impact on the potential and pace of adoption of the change. (Hagner & Schneebeck, 2001, p. 6)

The institution’s vision for the future of learning, and learning technology’s role in that vision is a significant factor in the likelihood that learning technologies will be accepted. In an educational model that is historically characterized by the extremes of
solely face-to-face education or entirely distance education, hybrid models that vest
control of the curriculum with the faculty members may work well (Young, 2002, p. 6).
A recent study at Canada’s University of Alberta found that the institution’s active
inclusion of faculty members in the dialogue and planning activities related to learning
technology is positively correlated to the likelihood that faculty members will adopt and
utilize learning technology innovations (Anderson et al, 1998, p.94). Armed with a
complete understanding of the faculty culture, institutions can critically evaluate all
organizational activities and create the kind of supportive environment in which teaching
methods that include learning technology can develop (Creighton & Buchanan, 2001, p.
2; Schifter, 2000, p. 2). If learning technologies are to be fully incorporated into the
teaching and learning activities of higher education institutions, organizational systems
and reward structures must be open for re-evaluation and re-visioning to encourage the
kind of cultural change that adoption of new and different attitudes toward teaching and
learning with technology will demand.

_Framework and Model_

It is in the receiver’s perceptions of the attributes of innovations, not the
attributes as classified by experts or change agents, that affect their rate of
adoption. Like beauty, innovations exist only in the eye of the beholder.
And it is the beholder’s perceptions that influence the beholder’s
behaviour. (Rogers, 1995, p. 212)

In his seminal work in the field of innovation diffusion, Everett Rogers proposed
a model of innovation diffusion that diagrams both the frequency and cumulative
adoption rates of innovations. The frequency curve, which has been referenced in other
academic research into faculty adoption of technology, is a traditional bell curve which
highlights points along the time continuum of innovation adoption, where each of the adopter categories (Innovators, Early Adopters, Early Majority, Late Majority, and Laggards) are most likely to adopt the proposed innovation. Each of these adopter categories or ideal types “are conceptualizations based on observations of reality” (Rogers, 1995, p. 247) and reflect dominant characteristics and values that have been derived from Rogers’ research. Relating to the adoption of innovations, the dominant characteristic of Innovators is “that venturesomeness is almost an obsession” (Rogers, 1995, p. 248). Individuals grouped in this category are described as being prepared to explore the potential of the innovation, regardless of their success rate with the innovation. Early Adopters, on the other hand, “serve as a role model for many other members of a social system ... and ... make judicious innovation decisions” (Rogers, 1995, p. 249). This is the group that will embrace new technologies as they are explored, and will model the application of the innovation for others who are less inclined to “debug” new technologies.

The “majority” categories, Early Majority and Late Majority, reflect both ends of the average adoption rates. Rogers describes Early Majority adopters as “deliberate”, as they tend to adopt innovations “just before the average member of a social system”, while he defines Late Majority adopters as “skeptical” due to their tendency to adopt innovations “just after the average member of a social system” (Rogers, 1995, p. 249). Both these categories of adopters are inclined to adopt innovations, but only once the benefits are demonstrable and the innovation is easy and affordable to adopt.

“Laggards”, according to Rogers, “are the last in a social system to adopt an innovation … When laggards finally adopt an innovation, it may already have been
superseded by another more recent idea that is already being used by the innovators” (Rogers, 1995, p. 250). Members of this group of innovation adopters are closely linked with traditional values, and tend to maintain a network of relationships with others whose orientation is traditional.

Intent aside, labeling groups according to their adoption of innovations has, of necessity, a pro-innovation bias, so any categorization of hesitant or reluctant adopters, regardless of their motivation, will appear to be disparaging. It is therefore critical, in the context of this research, to acknowledge that individuals adopt innovations at different times, but consider instead the variables that are most likely to influence the adoption or use of the learning technology innovation in higher education.

In addition to his oft-referenced frequency graph of innovation adoption, Rogers proposes a set of variables that he postulates influence the rate at which an innovation will be adopted. More than the frequency curve, it is this set of five key variables that are particularly applicable to this research. Rogers identifies these variables as the “perceived attributes of the innovation”, “types of innovation-decision”, “communication channels”, “nature of the social system”, and “extent of the change agent’s promotional efforts”. (Rogers, 1995, p. 207) Each of these variables influences the likelihood that the innovation will be adopted.

Perceived Attributes of the Innovation

“Perceived attributes of innovation” are, in Rogers’ model, several and varied. The relative advantage of the innovation speaks to the degree to which the innovation is perceived as being better than the idea that it supersedes (Rogers, 1995, p. 212); the likelihood that using learning technology in his or her teaching will provide the faculty
member with greater advantages than not using the learning technology at all. These advantages may be the perception that the use of learning technology will be viewed positively by the Dean or Department Head, that employing learning technology will enable face-to-face instructional time to be used for more in-depth discussion of curriculum, or that making strategic use of learning technology will allow the instructor to reduce the amount of face-to-face contact time with the students without compromising the quality of the students’ learning experience.

Compatibility, or the degree to which the use of learning technology is consistent with the individual faculty member’s existing values, past experiences and perceived needs (Rogers, 1995, p. 224), is also a significant variable in the likelihood that the faculty member will adopt and use learning technology, and is consistent with Pratt’s postulation that beliefs about teaching and learning are fundamental to the faculty member’s actions in teaching (Pratt, 1998, p. 21). A faculty member who believes that face-to-face lecture or seminar is the only effective method of communicating curriculum content and interpretation is unlikely to be enthusiastic, or even willing, to adopt and use learning technologies in their teaching. On the other hand, a faculty member who believes that effective learning is based in communication between instructor and students, and that the form in which that communication takes place is not as critical as the quality of the interaction, is more likely to adopt and use learning technology in their teaching.

Rogers also postulates that the complexity or ease of use (Rogers, 1995, p. 242), the trialability or ability to experiment with the technology (Rogers, 1995, p. 243), and the observability or ability to see the technology in action (Rogers, 1995, p. 244) are all
either positively or negatively associated with the likelihood that a faculty member will adopt and use learning technology. Thus, faculty members who are not technologically sophisticated, or who do not wish to become technicians, are more likely to adopt the use of learning technology when it is easy for them to use, they have an opportunity to experiment with it before committing to using it in their teaching, and have a network of peers who use and can demonstrate the ease and success of use.

*Types of Innovation Decision*

Another key set of variables in Rogers’ model is the type of decision-making process used to enact the change. He identifies these decision processes as optional, which leaves the decision to adopt or refuse to adopt the innovation up to the individual; collective, which establishes group norms that members are then expected to adopt; and authority, in which an authority figure requires adoption of the innovation. He editorializes that the fastest way to ensure adoption is to use an authority innovation-decision process, but cautions that it is also most likely to result in individuals circumventing the process during implementation. Both the optional and collective decision processes take longer than the authority process to establish and implement, but are more likely to result in considered, thoughtful and long-term adoption of the changed way of operating (Rogers, 1995, p. 207).

*Communication Channels and the Social System*

Rogers also identifies the communications channels used to diffuse the message about the innovation, the norms and degree of interconnectedness of the social system, and the extent of the change agent’s promotion efforts as factors affecting the likelihood
that the innovation will be adopted (Rogers, 1995, p. 207). Communication channels are the means by which messages and information are passed from one member of a social system to another, and the two key types of communication channels available are the mass media and interpersonal channels. Each has its own strengths: the mass media channels such as newspapers and publications of professional associations work well to raise awareness of the availability and potential of the innovation. Interpersonal channels, on the other hand, are most effective when they place peers face-to-face to discuss and demonstrate the innovation and its potential. Interpersonal channels have proven highly effective in encouraging innovation adoption among late adopters, as it encourages modeling and imitation by potential adopters, and affects and is affected by the norms and interconnectedness of the members of the social system.

**Change Agents**

A change agent is an individual who identifies and works with opinion leaders of a group to affect innovation diffusion in the desired manner (Rogers, 1995, p. 208). As the change agent’s role is to address the change, not to be a subject-matter expert, they will be most effective when they identify users of the innovation, and match them with opinion leaders of groups who have not previously indicated an interest in adopting the innovation. Communication issues are a significant concern in working to change an organizational culture from what has been an institutional standard for so many years, so a key element of the change agent’s promotional effort is to bridge the gap and make the message about the potential for the use of the innovation clear and comprehensible.

The variables that Rogers has identified as being likely to affect the adoption of innovations are fundamental to the understanding of the hesitance that some faculty
members may feel toward adopting the use of learning technology in their teaching. Applying this model to the questions posed to faculty members about their use of learning technology in their teaching will help systematically identify areas of faculty concern, and will help the institution develop or refine a strategy to address these issues.

**Implications of Adopting and Using Learning Technology**

Adopting and using learning technologies in teaching has implications for many of the elements of the institution, including the institutional culture, roles and relationships within the institution, and the teaching and learning functions.

**Culture**

*University Culture*

In conventional universities, education has long been understood to be the result of transmission of information from instructor to students (McCain, 1999, p. 3). This transmission model of education exists in most universities and colleges, and is characterized by the professor lecturing to groups of students (McCain, 1999, p. 3), supported by libraries, which have traditionally supported the lecturing professor by holding the keys to research and knowledge (Massy & Zemsky, 1995, p. 2).

However, in a world where knowledge doubles every seven years and 10,000 scientific articles are published every day (Smith, 1997, p. 1; Oblinger & Maruyama, 1996, p. 1), changes in the systems and organizations of higher education seem inevitable. The transmission model of education was appropriate when information was scarce and information resources were not as readily available to individuals as they are
today (McCain, 1999, p. 2), but universities "are no longer the quiet, ivy-covered bastions of teaching and contemplation that were popularized in books and motion pictures during the first half of the twentieth century" (Middaugh, 2001, p. 1). The shift from an elite- to a mass-education model increases the heterogeneity of the student population (Black, 1992, p. 198), and changes to the systems that support the increasing numbers of students are demanded.

Technology as a Culture

Technology itself, and particularly the Internet, displays many of the qualities of a unique culture; it has its own language, symbols, rituals, organization, procedures and mindset (Carr, 1998, p. 2; Franklin, 1999, p. 3). This new culture is regarded with skepticism by some (Young, 2002, p. 6), and as a potential threat by others who perceive no need to change existing academic community structures (Carr, 1998, p. 2). Freedom from the constraints of time and place, and the flexibility granted to users through application and use of learning technology may be perceived as the true strength of learning technology (Oblinger & Maruyama, 1996, p. 6), but the concomitant development of institutional infrastructures to support the use of learning technology may turn facilitation into dependency (Franklin, 1999, p. 100). As infrastructure is established and use of the technology is widely accepted and standardized, the ability to explore and experiment with new technologies diminishes. Users have less scope and their needs are no longer the main concern of those responsible for maintenance of the agreed-upon standards (Franklin, 1999, p. 101).
Learning Technology in the University Culture

It is virtually impossible to ignore the impact of communication technologies on the world in general, and it is unimaginable that higher education would be immune to these pressures. Students already, increasingly, expect institutions to provide administrative support on-line, and many faculty members already use e-mail extensively in communications with their students as well as in their research. Teaching and learning activities are likely to be affected by the use of technology, but making appropriate and effective use of these technologies will require that traditional institutions “transform themselves in fundamental ways” (Massy & Zemsky, 1995, p. 1) to fully exploit the new technologies; even if traditional institutions choose not to exploit the new technologies, they can rest assured that nontraditional providers of education will seize the opportunity to do so (Massy & Zemsky, 1995, p. 10). Regardless of the arguments for and against the adoption and use of learning technology in teaching, those who advocate its broad implementation and use expect to encounter significant levels of resistance within the institution (Navarro, 2000, p. 296).

One of the key issues in the debate over adoption and use of learning technologies is an economic one. Learning technologies can be employed to make education more economical, accessible (Massy & Zemsky, 1995, p. 2), efficient and creative (McCain, 1999, p. 4). These benefits, however, fail to address concerns that faculty members are being encouraged to use learning technology as a means to reduce the number of teachers and classrooms, thereby undermining faculty members’ autonomy and independence (Noble, 1998). While it is certainly an administrative truth that supporting students’ learning at a distance from the institution reduces demands on the institution’s physical
plant, effective technology-based teaching and learning requires extensive economic investment to ensure that adequate levels of computing and network facilities are available and operating efficiently, and that the labour costs associated with adequate levels of technical support are covered (Navarro, 2000, p. 295). Such expenditures may more than offset any savings offered by reducing the demands on the physical plant (Navarro, 1995, p. 295).

Another significant issue in the debate over adoption and use of learning technologies in higher education can best be described as the variety of obstacles faculty members face in using learning technologies. Time pressures, a sense that learning technology-based teaching leads to depersonalization (Fuller et al, 2000, p.3), lack of technical support or software, inadequate equipment, lack of faculty or administrative support, insufficient preparation time to create appropriate assignments, students' lack of knowledge of or resistance to using learning technologies (Daugherty & Funke, 1998, p. 35), and concern that the institutional funding model will not reflect the cost of the time needed to design, develop and implement learning-technology based materials (Daugherty & Funke, 1998, p. 36) are obstacles that require careful consideration.

Faculty members often are not aware of the successes that their colleagues have had in using learning technologies in their teaching (Mills & Pumo, 2000, p. 16; Buckley, 2002, p. 32), so may not be aware of the potential benefits that learning technologies may offer them in their teaching. It is clear that educational administrators must understand the concerns of their faculty population in order to provide an environment that maximizes motivating factors and minimizes inhibiting factors for participating faculty (Schifter, 2000, p. 2).
Commercialization of higher education is a significant concern for some faculty members, and the technological transformation that many universities have undergone has been claimed to be “a vehicle and a disarming disguise” (Noble, 1998) in this issue. Adopting and using learning technologies does tend to make instructors and their teaching more public (Batson & Bass, 1996, p. 5), but capturing and codifying knowledge using learning technology tools (Twigg & Oblinger, 1996, p. 10) and making the developed material available on subsequent occasions may be perceived in another light. The skills required to produce learning technology-based material, including the voicing, scripting and multimedia production, are not the same as the skills required to teach (Navarro, 2000, p. 294), and aside from “the time and cost involved, it is for this same skill-related reason that every instructor does not write his or her own textbooks” (Navarro, 2000, p. 294).

Learning technology “needs to be examined as an agent of power and control” (Franklin, 1999, p. 3), as these issues lie at the heart of the concern that instructors’ autonomy, independence, and control over their work (Noble, 1998) are at risk as learning technology is increasingly adopted and used. There can be no doubt that the adoption and use of learning technologies challenges the definition of autonomy which dictates that a professor can individually decide what, when, and where he or she teaches (Massy & Zemsky, 1995, p. 4). Indeed, it is the interconnected nature of learning technology that presents challenges and opportunities for faculty to change what they may well prefer to leave untouched (Massy & Zemsky, 1995, p. 9).

Access to learning technology is another significant issue in the debate. Ownership of equipment, access to systems, and knowledge of the codification structures
that allow and support technology-based communications are creating a new structure of “haves” and “have-nots” (Franklin, 1999, p. 152). The concept of technological ”haves” and “have-nots” is a reality and is an issue that institutions and individual faculty members who opt to adopt and use learning technologies must take into account in their planning processes, because “when a technology, together with the supporting infrastructures becomes institutionalized, users often become captive supporters of both the technology and the infrastructures” (Franklin, 1999, p. 95).

Many of the issues raised in the debate over the adoption and use of learning technologies seem to be founded in a belief that the options are all-or-nothing; that an institution must either commit entirely to the use of learning technology or dismiss it altogether.

What is less common, or perhaps simply receives less attention, is an institution that makes a careful, reasoned decision to embrace distributed learning technologies not just as an addition to its campus offerings but as a way to strengthen the campus experience and better serve existing student populations (Creighton & Buchanan, 2001, p. 2).

This “careful, reasoned” approach requires an institutional vision of the use of learning technology that has the full support of all institutional constituents; it must move beyond the “Let a Thousand Flowers Bloom” model that is characterized by individual faculty members taking the initiative to develop learning technology-based materials (Creighton & Buchanan, 2001, p. 2). The “careful, reasoned” approach should develop the impetus to create “a campus that harnesses the best attributes of a physical campus and the greatest strengths of technology” (Creighton & Buchanan, 2001, p. 2).

The potential benefits of learning technology should not pass unnoticed in this debate. One potential benefit is the increased access to enormous quantities of
information (Massy & Zemsky, 1995, p. 2). The utopian learning technology environment, in which e-mail, bulletin boards and computer conferencing are ubiquitous, offers the potential to democratize the educational space because it breaks down social barriers and status distinctions among its participants (Fuller et al, 2000, p. 3). Yet, in the context of growth and change, and focused on the issue of adoption and use of learning technology that is characterized by the debate of economic issues and the obstacles to adoption, it is important to remember that “the whole point of learning technology ... is to improve teaching and learning, not just to open up access to new information and experiences” (Laurillard, 1997, p. 217).

**The Role of Faculty Members**

An understanding of the role of faculty within higher education institutions is useful in the debate about the adoption and use of learning technology. Establishment of admission criteria, curriculum development and oversight, program completion standards, student advising, provision of learning resources, and even faculty hiring, performance evaluation, promotion and tenure, are all academic responsibilities and, when taken together, comprise the academic system (Carney & Long, 1999, p. 11). However, not every faculty member holds responsibility in each of these areas; rather, it is through division of responsibility for all these areas among a variety of faculty roles and amongst all faculty members that the system works. Most faculty members are responsible for three key activities in the life of the academy: teaching, research and service. These three activities are undertaken and performed in various combinations by individual faculty members, and these efforts combine to serve the goals of the institution.
as a whole. However, as questions relating to research and service fall outside of this investigation into the adoption and use of learning technology, this discussion will focus on faculty members’ teaching roles.

The process by which an individual becomes a faculty member does not necessarily demand formal training as an instructor. Entering the institution, new faculty members are expected to have completed a doctorate degree, through which they have acquired content specialization and expertise (Noone & Swenson, 2001, p. 22); the epistemological stance that the candidate develops tends to be contingent on content area and rarely encourages exploration into issues of cognitive development or learning how to teach (Buckley, 2002, p. 32). This narrow educational specialization may even preclude the development of interdisciplinary breadth of knowledge and the ability to synthesize the ideas of others that is the gift of great teachers (Noone & Swenson, 2001, p. 22). In the system as it currently exists, future faculty are educated and socialized in the same way that their instructors were (Malone, 1999, p. 147; Buckley, 2002, p. 32), so pedagogical developments may not be reflected in the teaching styles of these new professors. In the end, those who are employed by the institutions of higher education to do most of the teaching may not know very much about how their students actually learn (Noone & Swenson, 2001, p. 24).

Long-held understandings of what constitutes knowledge, and assumptions about the nature of teaching and learning form part of the current debate among educators and policy makers (McCain, 1999, p. 2), and the current move toward the adoption and use of learning technologies in institutions of higher education points in the direction of redefinition of faculty work (Wolcott & Betts, 1999, p. 34).
Teaching and Learning

"The future of learning requires an entirely different way of thinking about faculty roles" (Confessore, p. 174), and changes to the tools available to faculty members will likely affect both the teaching and learning experiences. Teaching is primarily about process because it is only 'in process' that its knowledge and skill are made manifest (Batson & Bass, 1996, p. 5), but teachers teaching does not produce learning because learning is ultimately the result of the learner’s effort (Senge, 2000, p. 284). However, the quality of the educational exchange can be assured so long as the “human touch” is maintained in the most appropriate form to the instructional context (Bates, 2000, p. 220).

Learning Technology and the Teaching/Learning Interaction

Three fundamental principles form a solid foundation on which consideration of learning technology in the teaching/learning interaction can be based: that learning is both a social and intellectual activity (Dede, 1996, p. 3); that the faculty member’s conception of learning determines appropriate ways for them to teach (Kerka, 2002, p. 4); and that adopting and using learning technologies does not guarantee that effective learning will take place, but that using learning technology inappropriately in the specific situation can make learning more difficult for the students (MacKinnon, 2002, p. 57).

Historically, learning was determined to have taken place when students could demonstrate that they had acquired and retained the facts and skills set out for them in the curriculum through successful performance on examinations. The information they were expected to reproduce was objective, and therefore not open to individual interpretation. This old transmission educational paradigm is being replaced with a new Learning
Paradigm, which describes learning as fully active and focused on the student as learner rather than on the instructor as the authority (Buckley, 2002, p. 30; Bork, 2000, p. 1). This new paradigm recognizes and respects the individual learning styles, needs and preferences of students, and the adoption and use of learning technologies provides higher education institutions with the ability to accommodate the required flexibility in the delivery of the curriculum (Oblinger & Maruyama, 1996, p. 6).

In addition to providing flexibility, learning technologies provide access to a broader range of sources of learning and knowledge (Oblinger & Maruyama, 1996, p. 6) and introduce currency and accessibility to the content being studied (McCain, 1999). While some argue that learning technology-based education will never equal, or even approach, an excellent tutor, it will enable faculty to move into the new learning paradigm (Bork, 2000, p. 2) with a powerful set of tools. However, careful attention must be paid to the processes in and through which teaching and learning actually take place in order to make the most intelligent uses of the learning technologies (Massy & Zemsky, 1995, p. 3). Studies have shown that threaded bulletin board and on-line discussions can be valuable components of any online course, that well-executed on-line materials can satisfy students’ needs as well as the traditional classroom can (Navarro, 2000, p. 292), and that both graduate and undergraduate “cyberlearners” can perform as well or better than students in the traditional classroom (Navarro, 2000, p. 293).

Faculty members are always concerned with the quality and integrity of the teaching and learning processes for which they are responsible (Daugherty & Funke, 1998, p. 23), so they should bear in mind that the transactional nature of the exchange of ideas between instructor and students informs the quality of the resulting outcomes.
Human contact in teaching and learning remains an important factor in the construction of these transactions (Anderson et al., 1998, p. 86), so the new pedagogy and instructional techniques demanded by the incorporation of learning technology must be embedded in the instructor’s existing learning context (Laurillard, 1997, p. 221).

**Learning Technology and Epistemology**

Every instructor works from his or her own particular learning context, which is informed by personal preferences, beliefs and values about what they teach and how best to teach it to students (Nesbit, 2000, p. 298). This set of beliefs about the nature of knowledge and how to help their students develop knowledge forms the instructor’s epistemological stance (Batson & Bass, 1996, p. 4), which he or she may hold with a greater or lesser degree of clarity (Pratt, 1998, p. 5). It is this epistemological stance that informs the instructor’s approach to the curriculum they teach, and that will, if they have the inclination, guide them to adopt and use learning technologies that have capabilities that are congruent with their epistemologies (Batson & Bass, 1996, p. 45).

In order to be effective in making any changes necessary to adopt the collaborative, active and inclusive pedagogy that characterizes the Learning Paradigm, faculty members should revisit their perspectives on knowledge, authority and learner capability (Magolda et al., 1993, p. 6). This type of re-examination allows faculty members to make the theories and beliefs that underpin their existing teaching practice explicit, and allows them to more clearly connect their consideration of learning technologies to their epistemological stance (Nicholls, 2002, p. 2). This re-examination should also revisit the faculty member’s belief about who their students are and how they
learn, what kinds of other demands are being made on them, and what their educational
goals are (Magolda et al, 1993, p. 5). All these elements are signposting the development
of a new culture of teaching and learning (Magolda et al, 1993, p. 6).

Learning Technology and Pedagogy

This emerging culture of teaching and learning, and the inclusion of learning
technology in the teaching process, begs an examination of the fundamental question of
what activities learning technology could replace. For without changes in teaching
methods, learning technology will only add to workload (Bates, 2000, p. 225) by
compressing time and space for teaching and learning, but will not realize its potential of
improving the lives, workload, relationships and stress level of the instructors (Cheldelin,
2000, p. 60).

It has been argued that learning happens when an individual makes meaning of
new knowledge by reflecting on it, placing it in some experiential or practical context and
practicing it (Noone & Swenson, 2001, p. 28). By this definition, learning is a highly
individual experience and one that cannot be the same for all students. So, as the student
body in any educational undertaking will be heterogeneous, faculty members will be
called upon to be open to differences in levels of preparation for study, learning styles,
and availability of time for study (Magolda et al, 1993, p. 2). Faculty members will
likely be called upon to expand the perspectives from which they are able to teach
(Magolda et al, 1993, p. 2), and be prepared to be a manager of students’ learning
experiences as well as an information transmitter (Noone & Swenson, 2001, p. 28). The
faculty member’s role is likely to develop into one concerned with creating the right
conditions for student learning (Noone & Swenson, 2001, p. 28), and a recent study has
indicated that some instructor personality types may be more compatible with the learner-centered dynamics created by the adoption and use of learning technology than other teaching styles (Fuller et al., 2000, p. 4). This connection was revealed through correlation between Myers-Briggs Type Indicator (MBTI) test scores and participants' evaluation of the online instructional experience.

The debate between subject- and learner-centered perspectives predates the development of most learning technologies, but the availability of the newer technologies transforms the debate (Paris, 2000, p. 97). Research demonstrates that student-centered teaching methods increase significant learning by students (Fletcher & Patrick, 1999, p. 27) by actively engaging them with the content and encouraging them to approach the content critically. It has also been demonstrated that employing a variety of methods in presenting material improves the experience for everyone involved in the teaching and learning process (Fletcher & Patrick, 1999, p. 26), and that multiple formats of presentation provide opportunities for multiple forms of engagement (Young, 2002, p. 4) and deeper learning.

**Change**

New learning technologies and new applications of learning technology seed social change and begin to unravel social and political patterns (Franklin, 1999, p. 151), make instructors and their teaching more public (Batson & Bass, 1996, p. 3), shift the instructor/student dynamic (Fuller et al., 2000, p. 3), and change both the learning environment and the content of what is to be learned (Tremblay, 2001, p. 24). The
potential for changes of this magnitude cannot fail to affect the roles of faculty members and students, and the relationships between faculty members and students.

Changes to Faculty Roles

Faculty members are prepared to accept few mandates about teaching, and institutional mandates that move too far ahead of the faculty support for them rarely succeed further than stimulating faculty creativity in developing noncompliance strategies (Brown & Jackson, 2001, p. 18). In the learning technology debate, however, more than 90% of respondents to a recent study indicated that they already use e-mail to communicate with their students and feel that the Internet and learning technologies promote faculty-student contact (Testa, 2000, p. 238-239). This high degree of acceptance of the communication potential that learning technology offers, and the understanding that active learning is enhanced as students have greater access to faculty members and each other through e-mail, listservs and chat facilities (Testa, 2000, p. 240) indicates a high degree of readiness to adopt learning technologies more broadly.

The capabilities of the various learning technologies tend to blur the traditional conceptions of roles and responsibilities of instructors and learners in the teaching/learning exchange (Magolda et al, 1993, p. 4). Faculty members clearly operate at the heart of the knowledge development process (Senge, 2000, p. 283), but the perception of the faculty member's role in the educational process is moving away from one of provider of instruction to one of facilitator of student learning (Magolda et al, 1993, p. 6). The perception of the role of the faculty member in the learning community has changed with the increasing adoption and use of learning technologies (Paris, 2000,
p. 95) and the non-traditional forms of discourse that learning technology-mediated communication has enabled (Fuller et al., 2000, p. 3).

Accepting that learning technology changes and forms the faculty member's instructional strategy requires the development of a new relationship between the instructor and their instruction (Fuller, 1999, p. 3). The faculty member becomes the designer and facilitator of learning experiences, guide to collaboration and inquiry, experimenter, explorer, and developer of learners (Graves, 2001, p. 40; Cheleldin, 2000, p. 57; Oblinger & Maruyama, 1996, p. 6; Baker, 1999, p. 2; Dede, 1996, p. 3). They provide context for the learning activities, monitor their students' interactions and discussions, and perform meta-functions such as posing questions and summarizing discussions (Illinois, 1999, p. 28). Communication between faculty and their students may become more individualized and customized (Navarro, 2000, p. 295).

To facilitate communication in this way, faculty members may be called upon to develop new communication skills, or refine existing ones. These skills and personal characteristics have been described variously as sensitivity to the needs of participants, willingness to spend the time and effort, knowledge, persistence, enthusiasm, creativity, flexibility, patience, perseverance, willingness to experiment with various applications, ability to ignore the anxiety that the new technology creates, and a sense of humour (Daugherty & Funke, 1998, p. 37; Fuller et al., 2000, p. 3).

While many faculty members express concerns about the practical demands that learning technology will likely place on them, some faculty express concerns about changes in the locus of control of the educational exchange, power and vulnerability (Cheleldin, 2000, p. 63). If they are willing to adopt and use learning technologies in
their teaching, they are most likely to use learning technologies that work for them, do
not usurp their authority, provide productive ways of improving student learning,
enhance instruction, or make their jobs less demanding (Spotts, 1999, p. 6).

Faculty members are professionals with a complex sense of their identity, and are
more likely to resist change because of the period of transition that precedes full adoption
of the change than because of the change itself (Cheldelin, 2000, p. 61). The transitional
period requires that faculty members let go of old attitudes, old behaviours, and old ways
of conducting departmental business in order to make room for the new ways of conducting
departmental business (Cheldelin, 2000, p. 61).

Letting go of the old ways and moving to the new creates new demands without
necessarily eliminating the old demands: new demands on instructors’ time for
development of materials for distribution through learning technology methods,
insufficient levels and availability of resources to assist instructors in preparing materials
(Anderson et al., 1998, p. 86; Berge, 1998, p. 2), and lack of availability of funds to
acquire new hardware, software and other required infrastructure resources (Anderson et
al., 1998, p. 87). The transition period also requires that the faculty member become
familiar with the potential offered by the variety of learning technologies in order to
make appropriate assessments about adoption and use, which spotlights the lack of time
and resources for training and support (Mills & Pumo, 2000, p. 16; Anderson et al., 1998,
p. 87).

Faculty members want to see examples of proven applications and compelling
value of the learning technology applications before they invest their time and energy in
Positive perceptions of the value of a learning technology affects the likelihood that it will be adopted and used (Spotts, 1999, p. 9), most likely because many faculty members feel that the members of the learning community who push for experimentation with unproven learning technologies are not the ones whose time will be wasted if the technology fails to deliver on its promises (Brown & Jackson, 2001, p. 14).

Philosophical concern has also been expressed that the establishment of infrastructure builds dependency (Tremblay, 2001, p. 24), and that the use of learning technology decreases the level of human interaction and dehumanizes the education process (Anderson et al, 1998, p. 86). Some faculty members express alienation from the culture of technology (Anderson et al, 1998, p. 86), but research demonstrates that many of these barriers are perceived as fewer or less intense when institutions have invested in infrastructure, or when they are perceived as technology-capable (Berge & Muilenberg, 2001, p. 7).

The motivations for faculty members to adopt and use learning technologies are limited, depending on the institutional agenda. When adopting and using learning technology are not criteria for tenure or promotion, young, tenure-track faculty will be more strongly motivated to focus their time and attention on activities that will serve them better in the advancement of their careers (Mills & Pumo, 2000, p. 16). For established faculty members who have already achieved tenure, the question may be the even more fundamental one of whether they want to make a change at all. Without motivation, it is less likely that a change will be undertaken (Khodarahmi, 1999, p. 16).
Faculty Development Programs

The broad integration of technology is currently a major goal of most colleges and universities (Buckley, 2002, p. 32), but faculty development systems and programs must be transformational enough to produce changes in faculty members’ practices while being scalable enough to achieve systematic change (Buckley, 2002, p. 32). Change does not occur in a vacuum, and making change of the magnitude of the one learning technology presents to higher education institutions must be a formative process (Buckley, 2002, p. 32).

Transforming faculty members’ practices requires the creation of incentives that will encourage them to be willing to step back from familiar and perhaps comfortable teaching styles and to take the risk to teach new ways (Buckley, 2002, p. 34). A study of teaching styles related to the unique educational opportunities presented by learning technologies may make it possible to develop faculty development programs to assist faculty members in successfully adopting and using learning technologies (Fuller et al., 2000, p. 4). It may require that faculty members give up some sense of control as they consider how to transfer the authority of learning to their students, but technology can act as an agent for this kind of transformational experience (Buckley, 2002, p. 32) by encouraging faculty members to focus on pedagogical innovation instead of the technology per se. Unfortunately, much of the current faculty development with technology is not transformational and does not alter practice in a lasting way (Buckley, 2002, p. 32).

Transformational development requires engagement and recurrent development cycles in which innovative products and pedagogies are fashioned, used, and refined
Unfortunately, many faculty development programs consist of workshops or other evangelistic experiences that do not provide a sufficient opportunity to reflect and experiment, to probe new learning principles deeply (Buckley, 2002, p. 33). To achieve transformational faculty development, Faculty Development programs should use enabling, learning-centered technologies to couple faculty transformation with institutional change processes (Buckley, 2002, p. 33).

Changes to Student Roles

The traditional student role will be no more appropriate in the Learning Paradigm than the traditional faculty role will be. The adoption and use of learning technology is shifting the focus in education from the work of faculty – teaching – to the work of students – learning (Cheldelin, 2000, p. 57), and learners will be called upon to assume greater responsibility for their own learning (Baker, 1999, p. 2). Increasingly, faculty members will employ the principles of andragogy in their conceptualization of their students, and students will be expected to become more independent, experienced and active learners (Knowles, 1980, p. 3.19). Students are increasingly expected to be active participants in the construction of their learning, not passive recipients in the learning process (Magolda et al, 1993, p. 3).

Although the numbers of technologically-skilled students in the higher education system seem to be increasing steadily, “instructors cannot take for granted that students come to college having mastered basic technology skills” (Benson, 2002, p. 3). The ways in which information is created, delivered, and used in all aspects of work, business and government are changing rapidly, so educators must incorporate experiences creating and utilizing learning technologies to leverage new forms of expression like multimedia to
prepare students as workers and citizens (Dede, 1996, p. 2). Technology is now a competency that is required in the workforce: it is becoming another basic skill, and individuals are increasingly required to be able to use technology independently and collaboratively in their work (Oblinger & Maruyama, 1996, p. 1). Students are increasingly selecting curricula that enhance their chances of initial and sustained employment (Oblinger & Maruyama, 1996, p. 2), but strategies and methods for learning in an era of information abundance require different approaches than can be provided by institutions and processes that were designed for a time of information scarcity (McCain, 1999, p. 2).

The core skill for today’s workplace is not foraging for data but filtering a plethora of incoming information (Dede, 1996, p. 2), and students must learn that access to data does not automatically expand their knowledge; the availability of information does not intrinsically create an internal framework of ideas that learners can use to interpret reality (Dede, 1996, p. 3). It is in accessing, applying and making practical use of information that learning occurs and knowledge is created.

Changes to Relationships

The changes produced as a result of the introduction of learning technology to the educational transactions are many and varied. The epistemological stance of each individual instructor is called into question as they struggle with decisions about which learning technologies to employ in support of their teaching, and they struggle to redefine their conception of their role and tasks in the teaching and learning relationship. Changes to the tools and techniques available to communicate with one another, publish new knowledge, and collaborate without needing to meet face to face are affecting and
changing the instructor-student and scholar-scholar relationships that are part and parcel of the education system (Batson & Bass, 1996, p. 2). Perhaps the most significant change for individual instructors is the change that learning technology brings to the scholar-source relationship. No longer is the instructor the arbiter and gatekeeper of knowledge; the advent of the World Wide Web and development of powerful Internet search engines have changed the role of the student as well as that of the instructor. With access to the World Wide Web, students now have direct access to broad ranges of content and expertise often equal to that of their teachers and are encouraged to evolve from passive receptacles for teacher-determined information to producers of new Web knowledge.

**Conclusion**

This literature review has brought together material related to the potential implications of adoption and use of learning technology in teaching. It has offered a brief overview of the history of learning technology, and has explored issues related to culture in higher education organizations, the role of the faculty member in the teaching-learning relationship, and the changes that may be experienced as a result of learning technology adoption.

There is a need to explore the experiences and perceptions of a broad spectrum of potential learning technology adopters, to uncover as many of the underlying issues and concerns as possible. This research will open communication with a group of faculty members, invite them to share their experiences with, and perceptions of, learning technology. As a result, this research will describe the kinds and levels of support these
educators identify as being essential if the institution is serious about encouraging and making ubiquitous the adoption and use of learning technology in teaching.
CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

The Researcher Role

"One of the most serious shortcomings of diffusion research is the pro-innovation bias" (Rogers, 1995, p. 100): this was a serious consideration in this research. A pro-innovation bias is more often assumed and implied than clearly articulated in diffusion research, so it was extremely important to me, as a researcher, that the participants in this study be fully aware of my own background and interest in the area of learning technology as we started the interviews.

My interest in this subject emerged from my more than twenty years working in the University environment, most of which has been spent working in the distance education field. I began my career in the student services area of the unit working with faculty members offering distance education courses and the students taking them, and moved to a management position responsible for the Student Services area. Student registrations increased over time, and the technologies used in support of distance education delivery grew and changed. What began as a primarily print-based delivery format added audiotaped material, videotaped material, audioconferences, videoconferences, television broadcasts, and, ultimately, online delivery of course materials. Throughout this growth and development, the needs of the students and the needs of the faculty members remained remarkably consistent: ready access to required materials, unambiguous directions, and support to resolve problems.

The use of online delivery mechanisms gained enormous momentum in the late 1990s, and appeared to become ubiquitous rapidly. E-mail has effectively supplan ted
print-based communication as a preferred method of communication, and my experience in the DE&T unit and as a member of the University community has led me to believe that this rapid adoption has fueled a perception among institutional learning technology planners that online and web-based course delivery systems are similarly desired by the majority of students and faculty members.

Introduction of WebCT software moved the capacity to develop and mount online courses from the purview of distance education specialists, and put it into the hands of any faculty member or content expert willing to spend the time needed to learn how to use it. The promises of fast and easy creation of online course content with minimal effort and maximum reward, along with institutional support for and provision of the software, has enticed many faculty members to explore the use of online tools to support their teaching.

In concert with this availability of new tools, educators began to talk about integrating online curriculum delivery with face-to-face classroom teaching. Conceptualized as a continuum of delivery mechanisms, from entirely face-to-face to entirely distance, the potential for a "distributed learning" method began to be discussed. This concept integrated online curriculum delivery with face-to-face discussions, and offered faculty members a new way to think about their role and a new set of tools to help them implement their vision.

This new concept, coupled with the consultation process that led to the creation of three institutional strategy documents related to the University’s mission, vision, and plan for the use of learning technology, led me to wonder how individual faculty members like the ones I have worked with feel about all the changes that have been proposed, and all
the changes that are taking place around them. My curiosity was piqued even further when I attended a workshop at which faculty members were discussing, and trying to grasp more fully, the potential these changes offered them in their own teaching.

In order to establish rapport with the participants in this study, and limit any assumption of a pro-innovation bias on my part, the interviews began with an overview of my work history and a description of my personal curiosity about the disincentives, as well as the incentives, to faculty members "trying out" learning technologies in their teaching. Participants were then invited to reflect on their teaching from a personal perspective. This approach was taken to allow those participants who began by articulating a concern that they had nothing to contribute to the debate an opportunity to recognize that their personal experience was valuable and valid in the context of diffusion research. The discussion moved from the participant's personal teaching experience to a discussion of the tools and techniques they use in their teaching, and then to a discussion of their own definition of learning technology. Questions of support for the adoption and use of learning technology, awareness of colleagues' use of learning technologies, and departmental discussion about learning technology were also raised. Finally, participants were asked if they had ever personally participated in a learning technology-based course or workshop. The general direction of the discussion from personal experience to more general awareness of the subject was deliberate, and designed to open the discussion and allow individual participants to define "learning technology" as broadly or as narrowly as they wished.
The Sample

In order to ensure that the sample group would be a manageable size, and to ensure that an opportunity for full participation would be available to all participants, twenty-nine faculty members in the University of British Columbia's Faculty of Education were approached to participate in this study. These faculty members form a discrete group within the Faculty structure, yet members of this group have a broad range of subject expertise and a significant range of experience with and interest in learning technology (ref. Table 1).

The range of professional and research interests represented ensured that the group would not be too homogeneous, and it is entirely reasonable to assume that their perceptions about learning technologies have been influenced by the range of academic influences indicated by their varying subject expertise. Academic disciplines tend to vary in their pedagogical standards, so faculty members will come to the department with their own discipline's orientation and pedagogical perspectives. It is this very breadth of academic background and pedagogical expectation that makes an interdisciplinary department such a rich environment.

However, the faculty group that was chosen cannot be said to be representative of the institution’s entire instructional community. As a community of faculty members primarily engaged in research and teaching graduate-level courses, these faculty members are not subject to the same pressures of teaching large cohorts of less sophisticated and experienced students as their colleagues in other faculties and departments who teach at the undergraduate level. Some of these faculty members do teach in the Teacher Education Program, but this program is not a conventional undergraduate program:
students in Teacher Education have completed a full undergraduate degree before entering this program, so they have a degree of sophistication and experience that is lacking in a first-time undergraduate experience. A few of this study’s participants teach in undergraduate programs in other faculties, and these faculty members tended to reflect a different perspective on the issues related to using learning technology in teaching undergraduate and graduate students.

The sample was drawn from the Faculty of Education and invited to participate in this study. Twenty (69%) of those invited participated in the study willingly, and contributed their perceptions frankly and openly. A further five (17%) were unavailable to participate for a number of personal or scheduling reasons. Three (11%) of those invited refused to participate in this study, while one (3%) individual was unreachable.

Interview Context

The research was conducted through one-on-one interviews with individual participants. Interviews were chosen as the research method over a questionnaire or survey method because interviews are the most efficient means of tapping into participants’ thought processes (Worthen, 1997). They are also the most effective research method for gathering data about perceptions and preferences, as they permit the researcher and participant to develop a rapport that will permit exploration of the subject in some depth.

The interviews were conducted in a semi-structured format, to allow both the researcher and the participant latitude to pursue interesting and informative avenues of discussion as they opened up, without being constrained to follow a set script. The semi-structured interview format allowed the researcher to ask open-ended questions about the
faculty member's experiences with and perceptions of learning technologies, allowed the participants to articulate as much or as little as they wished to reveal, and permitted probing for depth in the responses. This process allowed the researcher to develop a deep understanding of the participants' positive and negative perspectives on the use of learning technologies, and to probe deeply into the resistance that some faculty members displayed toward acceptance and adoption of learning technologies.

**Permission**

Initial permission to conduct this study was sought from the University's Office of Research Services and from the Department Head through completion and approval of the standard Ethics Review form. When permission was received, agreement to participate in the study was sought from the individual participants by way of an introductory letter and request for participation, distributed through the campus mail service. Non-respondents were followed up by way of in-person, telephone, and e-mail contact. Once the participants had agreed to be interviewed, meetings were arranged at a time and location most convenient to the participant.

At the interview, participants were given a consent form to sign, a copy of which was sent to them following the interview. This form contained a brief overview of the project scope, assurance of confidentiality of the data, and my telephone numbers, should they wish to contact me after the interview. The consent form also contained the telephone numbers of my research supervisor and the University's Office of Research Services, in case participants had any ethical concerns about the study.
**Data Collection**

In order to ensure that the interviews were recorded verbatim, and to minimize the disruption that would inevitably result from the researcher making notes during the interviews, the interviews were taped and transcribed. The framework for the interview questions came from the focus of the study, and from concepts highlighted in the literature.

Prior to conducting interviews with the participants, the framework for the interview was developed with the assistance of my thesis advisor and committee; subsequently, interview questions were pilot tested with instructional designers at the University. The pilot interviews gave me an opportunity to work through technological and logistical issues, and allowed me to assess the quality of responses the proposed questions would likely engender.

The interview began with an overview of the researcher’s background and interest in learning technology, and to address any concerns about any pro-innovation bias the researcher may hold. Participants were invited to ask any questions they had about the researcher or the research study, in order to establish and affirm the researcher’s openness to all perspectives and issues. The interviews lasted 45 – 60 minutes, and were taped and transcribed.

**Confidentiality**

In order to protect participants’ anonymity, their names and all contact information are kept separate from the identification codes on the tapes and transcripts of their interviews. The coded list of participants’ names and contact information is stored...
separate from the interview transcripts and tapes. Only my thesis supervisor and committee and I have access to the data.

I have been vigilant to ensure that any information that knowledgeable readers could possibly seize upon to identify the participant has been edited out of the research findings.

**Transcription and Data Analysis**

The interview tapes were transcribed as soon as possible following the interviews: I chose to transcribe the tapes myself so that I could listen to the interviews again and remind myself of the participants' intonation and emphasis. When the transcripts were complete, I reviewed the transcripts while listening to the tapes to ensure the completeness and accuracy of the printed transcript. With the second review of the tapes, themes began to emerge.

I read and re-read each transcript several times, highlighting words, phrases, sentences or paragraphs that captured and reflected the participant's concern in their own voice. I pulled the participants' quotes into an Excel spreadsheet, in which I was able to re-organize the quotes into thematic groupings. This allowed the themes and issues to emerge in the participants' voices.

The resulting data were analyzed using Rogers' diffusion research model, particularly with respect to the set of variables that he identified as affecting innovation adoption. Rogers' research is perhaps best known for the set of Adopter Categories he developed from his diffusion research, in which innovation adopters are classified as Innovators, Early Adopters, Early Majority, Late Majority, or Laggards, but I felt that
classifying the adopters would not advance the agenda of determining the underlying causes of individuals' willingness to adopt the proposed innovation. Instead, the Diffusion Elements and Innovation Attributes model formed the basis for the analysis of these data.

This model outlines the four key elements of innovation diffusion and the five perceived attributes of the innovation itself. Thus, the framework for analysis of the data can be represented graphically as follows:
**Trustworthiness**

Research is called upon to answer questions of its trustworthiness or soundness. According to Marshall & Rossman, four criteria determine the soundness of qualitative research: credibility, transferability, dependability, and confirmability.

**Credibility**

Credibility requires that the researcher demonstrate that an accurate identification and description of the subject matter has been provided. In this research, credibility has been demonstrated by the extensive use of the participants’ voices in the development of the themes, and the articulation of the issues.

**Transferability**

Transferability relates to the extent to which the research findings are applicable to the larger population from which the sample was drawn, or to other similar settings. As transferability can truly only be tested in its application, the greater onus for transferability rests with the researcher who conducts the transfer.

**Dependability**

Dependability lies in the assumption that the social world is always in process of being constructed and that conditions are always changing, in contrast to the positivist ideal that in order to be dependable, research must be replicable. In qualitative research, the researcher’s responsibility is to account for changing conditions.

In order to enhance the dependability of this study, I have used University policy and planning documents relating to institutional goals and objectives related to adoption and use of learning technology, and have stored them with the coded transcripts and data analysis charts, in case they should need to be accessed.
Confirmability

Confirmability asks whether a different researcher would arrive at the same findings as the current researcher, and is concerned with the influence of researcher characteristics or biases on the research and findings. Confirmability is enhanced by the degree to which the data itself leads to the conclusions, and is demonstrated in this study by the extensive use of the participants' voices in articulating the findings.

Scope, Implications, and Delimitations

Scope

The variables affecting adoption of innovations are numerous and complex, spanning the range of personal epistemology, pedagogical perspective and fiscal issues. External factors related to institutional and departmental culture with respect to learning technology are not guaranteed to be consistent across all faculties of the University. This study will be small and specific to one department.

Implications

This study may be of use to the University in several ways: individual deans or department heads may adopt this in-depth data collection model as a tool to engage faculty members in discussions about the adoption of learning technologies. The resulting data may be used by the Director of Learning Technology as a tool to identify specific areas of faculty concern as they work with the academic community, encouraging faculty members to develop learning objects, distributed learning modules or full distance versions of their curriculum. The resulting report may also be of use to the University’s Teaching and Academic Growth (TAG) unit in their identification of, and
plans to meet, the academic community's professional development needs in the area of learning technology.

This investigation was conceived in response to a perceived gap in the research to date in the area of faculty members' reluctance to adopt instructional technologies. Much of the research in this area focuses on the characteristics of faculty members who are innovators or early adopters of learning technology, and increasing amounts of research examines faculty members' technology adoption patterns. However, until the deep-seated reluctance, demonstrated by some faculty members, to embrace and use learning technologies in support of their teaching is fully understood and articulated, and the faculty members' concerns can be articulated and addressed, the use of learning technologies will continue to be ad hoc, institutional planning for the adoption of learning technologies will be speculative, and the potential benefits for students, faculty, and the institution will remain unrealized.

Delimitations

Timing of the data collection was a limitation of this study. External factors required that the data be collected during the summer months, which made levels of participation in the research lower than might have been expected from a personal interview methodology. Participation in research using the interview methodology can reach levels of 80 percent or higher, but this research was able to attract only 69 percent of potential participants. The non-participation rates were due to scheduling issues, unavailability of faculty members due to their other summertime commitments, disinterest in participating in this study, or inability to contact the potential participant.
Summary

Participants in this study were full-time faculty members in a discrete department in the University’s Faculty of Education. The twenty participants gave up to an hour of their time, at their convenience, to engage in a semi-structured interview designed to reveal their perceptions of the adoption and use of learning technology in their teaching and their students’ learning. The interviews were taped, transcribed, and analyzed for the themes that emerged from the participants themselves.
CHAPTER 4: DATA ANALYSIS

Introduction

The data drawn from the interviews with faculty members was collated and sorted according to the themes that emerged from the observations and concerns of the faculty members themselves. Seven overarching themes, and several sub-themes, emerged from this analysis and centered on questions related to observations about the nature of learning technology itself, availability of equipment and support, pedagogy, personal experience using learning technology, observations about potential uses of learning technology in teaching, and leadership in the use of learning technology. Several sub-themes emerged related to observations about the nature of learning technology itself, including the potential of the media, use of humour online, and the challenges of communicating without non-verbal cues to respond to. The thematic area of personal experience using learning technology developed sub-themes which include personal use of learning technology and workload issues, while observations about the potential for using learning technology developed sub-themes related to the uses of learning technology that faculty members have seen demonstrated, risks and benefits of using learning technology, ways of learning about technology, and training environment preferences. From the theme of leadership emerged sub-themes related to departmental discussions on the topic, as well as funding issues.

This thematic analysis was then categorized with reference to Rogers’ Diffusion Research framework. The themes and sub-themes that emerged from this research were further analyzed in relation to the elements that form Rogers’ framework of innovation.
diffusion research, and the attributes or characteristics that are used explain the likelihood that an innovation will be adopted. The results of the research are presented using this framework.

<table>
<thead>
<tr>
<th>Themes that Emerged from Analysis of Participants’ Contributions according to Rogers’ Model</th>
<th>Classification of Themes according to Rogers’ Model</th>
</tr>
</thead>
</table>
| Observations about learning technology itself  
  Uses that can be made of learning technology  
  Use of humour online  
  Non-verbal communication | Perceived Attributes |
| Availability of equipment and support  
  Access to equipment  
  Technical support | Relative Advantage |
| Pedagogy and learning technology  
  Individual choice to use learning technology  
  Personal experience using learning technology | Compatibility |
| Practical Considerations  
  Workload issues  
  Time and energy required | Trialability |
| Observations about potential uses in teaching  
  Demonstrations of learning technology  
  Risks and benefits of using learning technology | Observability |
| Ways of learning about technology  
  Training environment preferences | Communication Channels |
| Leadership in use of learning technology  
  Departmental discussion  
  Funding systems and priorities | Social System |
Faculty Members' Definitions of “Learning Technology”

This research examines the current levels of use, and impediments to broader use of, learning technologies in teaching and learning. Key to this discussion is a definition of “learning technology”.

Early in each interview, I asked the participants to give me their definition of “learning technology”. The following is sample of the definitions that were forthcoming:

Technology as aid in learning. (Interview 6)

Anything that helps us with learning. So everything is technology, whether it’s a pen or coloured crayons or computer graphics or an Excel spreadsheet. It’s any sort of technology that enhances learning. (Interview 3)

Anything that facilitates adult learning. (Interview 5)

Whatever facilitates learning ... what’s technology but a set of tools? Those tools could be the tangible sort, or any kind of techniques that allow you to get somewhere. Technology would be everything from expensive sophisticated stuff down to a pencil and paper that I use. (Interview 17)

Learning technology could be chalkboard, overhead projector, charts and diagrams and the use of lighting – all of those things are technologies that you’d have to take into account. (Interview 19)

These definitions of “learning technology” are the broadest and most inclusive ones available, but they do not account for the political climate within the institution. Other definitions provide a narrower and more specific focus to the question:

It can be in the classroom going from blackboard as the most traditional, simple way, and people now being able to use Power Point. You have that, and you have the electronically based things from e-mail discussion boards to using web-based as a complement for this. We have the technology going from the chalk to the computer. (Interview 4)

Learning technology – technology, when I think about it now, I think about any strategy we use in the classroom that is driven by electricity that
makes you a more effective teacher. I was sort of joking about electricity, but everything that I can think of does have that in common. (Interview 14)

People, when they talk about educational technology, all they’re talking about is what corporations that utilize digital technology have – talking about computers, talking about the internet, talking about digital – I don’t hear people bringing up anything else. I don’t hear them talking about photography, I don’t hear them talking about film. We just acquiesce to this form that essentially ends up being engaged with uncritically too often. (Interview 11)

For some, however, learning technology requires a unique approach:

I typically just think of technology as a way of doing something: and with the advent of computers and the web and all of that, I think people’s conception of technology has narrowed so when we hear about learning technologies or instructional technologies, I think people often think of the electronic technologies first thing. But I consider the overhead projector at least a device that is a form of technology; it’s a way of projecting images and so on that presumably can assist learning. So, I guess what I listen for is how other people are using the term technology and then try to adjust to that. I have, I think, a broader definition of technology than a lot of people do, and I just try to figure out how other people are using that in conversation so that we aren’t talking past one another. (Interview 9)

It will be from these situational descriptions that definitions will ultimately be reached. In its current phase of development, however, learning technology will be vulnerable to the prevailing political climate; several participants noted that current discussions about learning technology within the Faculty tend to focus on the use of wireless technology, and that other issues related to the learning technology agenda are not much discussed.

While my personal definition of “learning technology” tends toward breadth rather than narrow specificity, in order to respect the current political climate within the faculty and to make the understanding of “learning technology” as current as possible, for the purposes of this research and analysis, “learning technology” will be understood to
involve computers, and increasingly wireless technologies, and laptops, and access to the internet, and access to WebCT and chat rooms and communication that way. (Interview 16)

The Diffusion Model

Rogers' model for diffusion research identifies four primary elements related to successful innovation diffusion, and a number of variables that determine the rate of adoption of the innovation. The elements, and their associated variables, include the nature of the innovation itself and its perceived attributes, the types and numbers of communication channels used to disseminate information about the innovation, the time available and type of innovation-decision process used, the social structure into which the innovation is being introduced, and the visibility and support of change agents.

The nature of the innovation refers to the characteristics of the innovation itself, and the rate of its adoption is related to the perceived attributes of the innovation. These perceived attributes include the relative advantage of the innovation over the idea that it supersedes, the compatibility of the innovation with the existing situation, the degree of complexity in understanding and use of the innovation, the degree to which the innovation is available to experiment with prior to adoption, and the degree to which the results of use of the innovation may be observed by others.

The communication channels through which information about the innovation is disseminated is influenced by the relative homophily or heterophily of the group, and the rate of adoption of the innovation is correlated to the use of mass- or individual-communication methods employed.

The time available for diffusion of the innovation relates more to the innovation-decision process used than to the physical passage of time to effect the innovation
diffusion. The variables associated with the innovation-decision process that influence the rate of adoption are the choice between an optional-, collective-, or authority-based innovation-decision process.

The final element in the model is the social system into which the innovation is being introduced. The nature of the social system is described as the norms of the system and the degree of interconnectedness of its communication network. The rate of adoption of an innovation is related to the organization’s social structure, the activities of change agents within the organization, and the level of support from the opinion leaders within the social system.

This model forms a useful and robust framework for analysis of the data collected through this research into faculty members’ attitudes toward the adoption and use of learning technology in their teaching.

The Nature of the Innovation Itself

Perceived Attributes of Learning Technology

The general sense that emerged from the interviews was that learning technology has enormous potential as a useful tool, particularly in teaching large cohorts of undergraduate students, but that it also has significant limitations. The perspective that “the more you use it, the more you see potential for it” (Interview 2) was articulated, in counterpoint to another participant’s observation, based in personal experience, that “it is too much work and too complicated.” (Interview 4). The latter participant even went so far as to observe, “I’m not going to touch it as a complement. The only thing where it
actually helped, I’ve learned to find materials on the web to build into the courses.”

(Interview 4)

Several participants commented that, from their experience, learning technology lends itself to packaged material where there’s no real presence and no sense of community being built (Interview 5)

and

you’ve got a certain amount of ... insights, understandings that you want students to go away with, so ... using technology in some form or the other in terms of having this packaged is a good thing (Interview 8),

but that

it takes up a lot of time with an uncertain benefit (Interview 6).

The latter participant had used technology to “put all my lecture notes on this web site that we created ... and the students who’d missed class could just click on this and download them ... Those students who did have access to the web ... liked it, but I felt like it was quite time-consuming on my part” (Interview 6). The level of commitment of time and energy to incorporate learning technology as an adjunct to their face-to-face teaching was enough for many participants, because in order to exploit the unique advantages of learning technology to create an online community of learners, some participants felt that

you have to make these huge efforts to try and bring people into a shared identity as a group of learners (Interview 5),

or that

if you’re going to do that you shouldn’t be too responsive ... but if you feel that you have a greater responsibility, then it takes too much ... We have to find a middle ground where we are realistic with the resources we have (Interview 4).
Other comments relating to the general nature of learning technology reflected concern about the utility of learning technology as a communication tool. Concerns were expressed about the effect of learning technology on student-instructor and student-student relationships, and the ease with which misinterpretations and misunderstandings can develop and become difficult to resolve in the on-line environment:

the main limitation is that you’re not present, so no matter what you do to try and compensate for that technically, it’s never going to do it (Interview 5),

the technology is going to partly get in the way of people understanding the cultural background and the tradition and norms of conversation (Interview 9),

online ... it takes a while longer ... to find out there’s confusion, or that you’ve contributed to confusion by posing a question or using a concept (Interview 9),

you can misinterpret quite easily what someone says in written form over the internet (Interview 5),

and that

when the communication is mediated by e-mail, basically, and the web, it’s very easy for misunderstandings to develop (Interview 9).

Commenting on the experience of using on-line communication in a course, one faculty member observed that from their perspective, “the technology was in the middle, and it was not as good a learning with the technology” (Interview 11).

The relative difficulty in using humour in the online environment without creating or exacerbating misunderstandings or miscommunications was cited specifically as a concern:

if you’ve never met the people – and you’ve probably experienced this yourself – weird things can happen on e-mail. People will make a joke,
and if they don’t put in the proper little symbols to let you know it’s a joke, there can start to be real misunderstandings. Humour is a big part of teaching, and humour is a little hard to communicate – at least, I’m not the best at it over e-mail unless I know my audience already (Interview 6).

At their foundation, these issues reflect concern that in a technology-based learning environment, participant’s ability to see one another is a highly mediated experience, one which is still not within some students’ technological grasp, and one which removes one element of communication - non-verbal communication - without replacing it with an alternative that works as well. At least one participant expressed concern that

you don’t have a group of ... people learning together in a physical space where they can see each others’ bodies and faces and dress, and they can share a meal – which we often do in our classes here. Those are important aspects of education that you somehow can’t replicate on the web site or in distance learning. (Interview 5).

All of these elements build community in a subtle yet powerful way. As one participant expressed it, “I’m interested in community – creating community and the loss of community” (Interview 7).

Yet, technology itself is not necessarily viewed as entirely problematic: “the quality and depth of discussion is probably at least as good in a web-based course as it is in a face-to-face course, because people get more time to consider their responses and their comments are often more thoughtful” (Interview 9). Perhaps the best summary of the perceived attributes of learning technology in teaching is that “online and distance, or the use of e-mail can augment … but I don’t think that it can replace” (Interview 7) face-to-face instruction.
Relative Advantages of Learning Technology

A variable that is likely to affect the individual faculty member’s perspective on learning technology itself is the relative advantage it may offer users over their existing teaching methods. Needless to say, however, the advantages that may be obtained by using learning technology may not be readily realized due to perceived relative disadvantages. These fall into several categories, which will now be examined.

Availability of Equipment

While some participants in this study expressed some skepticism regarding the pedagogical benefits of using learning technologies, the practical issues of support loomed much larger for others.

Our equipment is minimal. Our classrooms are ostensibly wired, but try to use a computer and LCD in the classroom! To buy our own computers, it’s up to the individual to do the research – the support is not here. (Interview 3)

Participants expressed a sense of aggravation that shared equipment is technically available “but nobody monitors it” (Interview 3), so it is frequently unavailable in practical terms. Concerns about such “structural hindrances against using learning technologies” (Interview 12) were also expressed:

It’s a constant keeping ahead, keeping equipment up to date, keeping people skilled enough to use it, and the whole keeping the motivation and making sure that you have the right environment for technology to work or not (Interview 20),

Faculty have got to have the tools of the trade if they’re going to produce first-class teaching, and they don’t (Interview 20),

new faculty are provided with a set of computer equipment. But that’s it. So, I actually have to generate research funds to pay for all of my computing needs (Interview 20),
When it comes to needs in the classroom, I suppose in the final analysis, if they’re not available, they don’t get used. So the learning environment is poorer for it (Interview 20).

Support

Inadequate support, and the faculty members’ consequent inability to maximize the use of learning technology, is a source of frustration for many faculty members. Acquisition of software upgrades required “negotiation after negotiation after negotiation” (Interview 3) by one faculty member, while the current requirement that the instructor book equipment or lab space, and do the equipment setup and troubleshooting is a disincentive to many in making more extensive use of the learning technologies that are available. “The whole culture of support is extremely poor here” (Interview 3), and “we can’t even get the tables and chairs right, let alone the computing technology” (Interview 3).

In addition to a general lack of availability of equipment to support the use of learning technology in teaching, a lack of availability of what was variously termed secretarial or technical support staff was mentioned frequently as a factor that tended to discourage use of learning technology.

We do not have adequate supports to really maximize the use of technology (Interview 7),

I think that the level of support for faculty ... is spasmodic. I think that the kinds of support are, to some extent, are not equal (Interview 8),

and

We have some support in terms of scanning ... and updating my web site. But everything else I do myself. Everything. (Interview 3).
Faculty members identified the lack of sufficient numbers of support staff, trained in the technical demands of the learning technology, as an issue that reduces the appeal of using learning technologies and essentially makes this a relative disadvantage for many faculty members:

You need a different structure of support staff. You need to have people who really can help you, because it takes too long to sit down and fiddle with everything (Interview 4),

I would use all of them [the variety of available learning technologies] a whole lot more if we had a technician, for example, available to set up videos, setting up Power Point, finding projectors. Doing all of these things is actually a pain in the neck not having the support (Interview 20),

and

I would like the secretarial support or the technician support to be able to make certain technical things happen (Interview 17),

Several participants commented that they currently resist using learning technology in support of their teaching, due to the time commitment required to learn how to set up and maintain course web sites.

**Compatibility with Existing Perspectives on Teaching and Learning**

Beyond the unique nature of the learning technology itself, virtually all participants expressed opinions about the usefulness of learning technology in enhancing the learning environment.

Students want people who know stuff they want to know, who present it in an interesting fashion and seem to care about them. Three fundamental things, and technology is irrelevant (Interview 15),

I will use what I find valuable, and what students tell me is valuable (Interview 6).

In my teaching, I use it where I think it’s appropriate (Interview 16),
Whenever I have sensed that it could help me in my work, I’ve sought it out (Interview 6),
what interests me, or what I think might interest me, I do (Interview 12), and
It still comes back to a faculty member working with a bunch of students somehow (Interview 17).

**Pedagogy and Learning Technology**

At a fundamental philosophical level, an issue raised by a significant number of the study’s participants related to the pedagogic significance of learning technology, or “technology … in service of what?” (Interview 6). These concerns are reflected in statements such as:

the technology is driving everything and there’s not a lot of thought; people aren’t asking the important questions (Interview 7),

we’re supposed to understand pedagogy, and yet we don’t practice it very well (Interview 3),

I think there’s a lot of hype about it, and I think its money and technology in search of a problem (Interview 6),

I don’t think we’re asking the right questions – I think we’re doing technology for its own sake (Interview 16), and

we’re in service of it rather than it being in service of our needs and our students’ needs (Interview 7).

These concerns, which these faculty members do not perceive as having been addressed, are exacerbated by the perception that learning technology is currently being represented as an end in and of itself, rather than as the means to improve the students’ learning:
The use of technology – however it’s defined – is not the purpose. It’s the means to an end (Interview 16), and right now, with the technology drive, it seems like technology is the end in itself rather than the means to an end (Interview 14).

One faculty member expressed qualified support for the use of learning technology:

So long as people don’t get caught up in technology being an end in itself, and as long as they consider it a means to an end, and they’re willing to be challenged about whether people are going to learn more this way (Interview 14).

This perception of learning technology as a desirable end in itself may be fueled in part by the long evolution of technologies and the ongoing discussion and debate about the educational use that has been, and continues to be, made of them. From the development of written language to the invention of movable type and the printing press in the mid-15th century, and from the introduction of the blackboard and chalk in the early-19th century to the development and use of educational television and computers in the mid-20th century, each new invention or development has, in its turn, been hailed as the way of the future, and has contributed its unique benefits to the pool of resources available to educators. In this context of continual growth and development of tools and techniques available to educators, learning technology is the newest innovation that is purported to be the way of the future. This view is held with varying degrees of skepticism amongst faculty members: one participant observed rather wryly that they have “heard the transformation speech” (Interview 18) since the early 1960s when educational television was introduced, and now holds the view that “we imagine we’ve gone further than we have” (Interview 18). This participant also expressed the perception that one of the challenges associated with using learning technology as a tool to assist
students in constructing knowledge and developing new knowledge is that “there’s a sort
of fixity about it; that sometimes technology makes people think that we’re clearer about
what we know than we are” (Interview 18).

**Individual Choice to Use Learning Technology**

There are some who are quite keen on using that kind of technology for
learning … there are other members of the department whom I would
probably categorize as almost Luddites. They use computer technology to
the extent that they have to; they have to respond to e-mail … but as far as
incorporating it into their teaching, they would probably resist that.
(Interview 12)

A broad spectrum of skills, abilities and interests in the challenges and
opportunities presented by learning technology exists within the environment, so it may
be just as well that “nobody is going to be encouraged or forced to do it, so it is up to
everybody” (Interview 2).

I think it is largely individual interest, individual initiative, individual
experience and confidence with the technology that are driving those of us
who are trying to incorporate it into our instruction (Interview 9).

The individual’s perspective on teaching and learning is the primary motivator to
invest their time and energy in creating learning technology resources to support their
teaching:

the whole technology thing is snowballing, and there are different
individuals, by their personal characteristics, who are more enthused and
more likely to do this stuff than others (Interview 14).

In some cases, however, even when the interest exists, finding the time to develop the
materials can be problematic:

I do realize that some professors simply do this on their own interest or
volition, but I find that there are so many other things I want to do around
here that my progress is slow (Interview 17).
Faculty members who are interested in exploring the potential of adopting and using learning technology in their teaching have a variety of motivations for doing so:

I do care about reaching people who can’t be reached in other ways (Interview 18),

it would be interesting and entertaining to me if I could find other ways of teaching (Interview 15),

and

if I thought that better learning was going to take place, and that the goal was reachable through reasonably efficient means... I would experiment further (Interview 17).

Even as there are faculty members who are motivated to explore and use learning technologies, there are faculty members on campus who are “hunkering down rather than in fact engaging in discussions” (Interview 8). Based on knowledge of experience in other departments in the University, one participant observed that

there is a sense among faculty who are not supportive that these things are being imposed upon them; they’re taking away their intellectual freedom; there’s a whole set of arguments being made that you do hear ... there are a lot of faculty who are opposed because they don’t understand it, or because they don’t want to understand it, or because they consider they’re too old to understand it, because they think that it is anti-intellectual, anti-scholarly (Interview 8).

This research did not indicate resistance of this type within the group of participants, but one participant did comment that “technology interests me less than getting the fundamentals right” (Interview 15).

Taking both supportive and resistant perspectives into account, the general feeling about the choice to use learning technology in this group of faculty members is that to have the opportunity for faculty to make use of various kinds of teaching and learning technology is extremely good ... if faculty feel that they have support for moving ahead when they want to move ahead, that’s great (Interview 8).
This freedom respects both the desire for "recognition that that is going to take extra effort" (Interview 17) and the belief that

the best learning situation is a really good teacher who just teaches. And they may have technologies, but it's about who they are and what they have to communicate (Interview 15).

**Personal Experience Using Learning Technology**

While most of the online courses that are currently offered at UBC use WebCT software, the experience of this group of faculty members is varied. Several faculty members mentioned having used WebCT bulletin board and calendar functions in support of their face-to-face courses, while other faculty members have worked on the development and delivery of an internationally-offered graduate course that used BlackBoard software. Several participants commented on the relative merits of BlackBoard over WebCT; the general consensus among the faculty who have used online learning technology with their student groups, regardless of which software package they have used, is that much remains to be learned. As one faculty member commented, "I have some ideas about how to use more technology, more graphics, to use the web a bit more, but haven’t done a lot of that yet" (Interview 9).

In addition to all the issues and challenges reported above, some faculty reported that creating and using a course web site as a method of communication was more convenient than standard e-mail for both instructor and students:

it separates out [the course communication] from that larger spam that we get (Interview 7).
For others, however, participating in online instruction caused them to re-think their actions as an instructor:

I thought very deliberately about the kind of question I should pose or the kind of comment that I should make ... to keep the conversation going and not take it off in a different direction; to both be responsive to what the students were saying but also to try to synthesize or to help them see another way the conversation could be continued or redirected a bit ... I thought a lot more about what questions I was going to ask or what comment I wanted to make online than I typically do when I’m in the real-time situation or the face-to-face classroom (Interview 9)

For other faculty members, however, exploiting the potential of learning technology has enabled them to be more efficient in providing feedback to students:

I will now mark online. I mark the assignments by inserting comments right into the assignments and sending them back. I’m willing to do it because it seems fairly expeditious, and it accomplishes the same goals as I had before. I’m not shifting my goals, but I am using the technology in that way – it seems to work (Interview 17).

This solution still has some “bugs” for this individual, as he had not yet worked through the technological challenges associated with working on-line remotely from the campus, but that was the next planned step to fully integrate this solution into his way of working.

Faculty members’ reflections on their experiences using learning technologies reflect the wisdom borne of experience.

I think that I will try it again, but I think it’s always going to be in the context of the design of the course, rather than driving it (Interview 7), and

I think it’s a backup to in-classroom, hands-on, face-to-face instruction, and that’s the only time I would recommend it, other than for people who are very self-motivated who already have good skills (Interview 15)
At the most fundamental level, one faculty member's observation may be the most
telling: "I think I would, first of all, have to resolve that it's a good thing to do"
(Interview 17).

Fueling the resolution that learning technology is a good thing to do is a range of
faculty perspectives toward the learning technology itself. Statements ranging in
enthusiasm from "personally, I love computers" (Interview 3) and "personally, I love
technology" (Interview 16) to "I don't have a phobia about technology" (Interview 6)
were offered. One notable faculty member described themself as "a cranky learning
technology user" (Interview 7), explaining that they are happy with technology when it
works and creates time and space in their workday, but becoming irritated when it fails to
work. The determination of the value of learning technology is a highly personal one,
and one which may well vary from situation to situation depending on whether or not the
technology is working properly. As one faculty member observed, "It's made my work
life worse, and it's made it better" (Interview 7).

**Complexity of Using Learning Technology**

A key to determining the individual's perspective of the complexity of using
learning technology rests, quite naturally, in the individual faculty members' skills and
facility with computer hardware in general as well as with specific software packages.
Another key to determining the level of complexity that is likely to be experienced
centers in the individual's interest in exploring new hardware and software.

The faculty members who participated in this research were not, generally
speaking, unfamiliar with computer hardware and some standard software, but some of
the faculty members interviewed did not express a particular interest in or desire to
explore the use of computers much beyond their current level of use of software programs. For many, their first experiences in using WebCT were not particularly positive, and they found the software to be “ridiculously complicated and cumbersome” (Interview 4). Virtually everyone who had had occasion to try BlackBoard, as opposed to WebCT, indicated that BlackBoard was preferable from their perspective. They reported that it was more intuitive, easier to use, and they experienced significantly less frustration in getting their projects completed. None of the participants reported difficulty using standard e-mail packages in their communications.

**Trialability of Learning Technologies**

The opportunity and ability to experiment with new technologies, and to explore their potential through hands-on experience has significant implications for the perspectives that potential new users are likely to develop. Even as faculty members recognize that their students are likely to gain a more complete understanding of the curriculum through problem-based learning techniques, or through seminar-style discussions and debates, the institution’s opinion leaders and change agents need to recognize that faculty members are more likely to gain a full appreciation of the potential of learning technologies through the ability to experience working with them in concrete ways.

**Workload Issues**

A challenge to the experiential approach, and one facing faculties where problem-based learning techniques are being used, is that experiential learning requires time; time to explore, time to think, and time to play with concepts and skills:
the time and space to do a good job of teaching and designing curriculum, or maybe even learning the technology, is shrinking (Interview 7),

I’ve seen people’s PowerPoint presentations, and they’re kind of slick and nice and they’ve got video and whatever, but I don’t have time (Interview 14)

Preparing a course for full on-line delivery is quite different from preparing for face-to-face delivery:

What I’ve read about the resource demands of web-based teaching, and my brief experience with it so far, is that it actually is more time consuming to do a web-based course if it’s done well and if you’re really present in the course as an instructor than doing one on campus face-to-face (Interview 9),

and

I never planned a course so well. So often, you can wing it a little bit and then you can adjust it, but now it really had to be set (Interview 4).

A number of faculty members commented on the fact that, in addition to changing the nature of the instructional role, the incorporation of learning and other technologies is shifting the locus of control and responsibility for all manner of tasks and activities:

you can kill yourself if you don’t re-think your role as an instructor in a web-based course (Interview 9),

I think some people … don’t like to use technology; they don’t like the hassle, they’re worried about it not working when they need to have it work, and so on (Interview 9),

the work that we used to have clerical workers to do is downloaded to me (Interview 7).
Investment of Time and Energy

Faculty members’ willingness to invest the time and energy required to make effective use of learning technologies is inversely proportional to their expressed willingness to gamble that the outcomes will, in fact, be an improvement for them:

part of the issue is access, and the amount of time and trouble you go to setting up the projector and hoping everything works (Interview 14), and

all of us feel overloaded and overworked. I look at reward versus cost … you need to get them turned on to the possibilities so they see this reward versus cost issue, that the reward exceeds the cost (Interview 14).

For a number of the faculty members surveyed, the confidence that the reward would, in fact, exceed the cost was not present. The sentiment was expressed that preparing to use learning technology takes up a lot of time with uncertain benefit, and that, while a lot of technology is a “fabulous resource” (Interview 7), making use of it increases the faculty member’s workload and responsibilities:

I would not put my stuff on a web site if I had to do it myself – it just doesn’t seem to be worthwhile to me (Interview 17)

The relative worth of the use of learning technology is also closely related to the interest the individual faculty member has in technology:

I think people just feel generally overwhelmed by their jobs as it is. And even though some kind of investment in the future, or fore-thinking, sounds okay, the reality is that at least technology itself doesn’t attract them as a focus of interest (Interview 17).
Most of the faculty members included in this survey teach at the graduate level, and tend to lead seminars of fifteen to twenty students, as opposed to lecturing large cohorts of students. Many of them believed that they would be more likely to use learning technologies in their teaching if they were working with larger groups of students than typically are registered in graduate-level seminars. Contemplating teaching an undergraduate-level course, one faculty member commented “I can see where the sheer numbers and the structure of the material and the use of graphics would be vastly more sensible” (Interview 17).

Another perspective on the question of trialability of learning technology relates to the rate at which technologies change and advance. Technological demands change on a regular basis, so not only are faculty members required to invest the time and energy learning about the potential of the technology and how best to utilize the currently available learning technologies, they will also be expected to maintain currency in the field to continue to exploit the benefits of technology. Considering this issue, particularly in light of the concerns that faculty members expressed about their current workloads, and their hesitancy to become the “resident expert” (Interview 6) in a specific technological application, it seems likely that the sentiments that “The trouble is that these skills that we’ve developed, these quasi-programming skills, are in fact highly transient” (Interview 17), and “When you really have to learn a new language in order to program something adequately and deliver it adequately, I really do baulk at that kind of investment” (Interview 17) have the potential to become even more entrenched than they may already be. These are not minor considerations when a move is being made to develop and foster a culture of support for the use of learning technology.
Observability of Learning Technologies

In addition to trialability, the observability of learning technologies has significant implications for the perspectives that potential new users are likely to develop. Observability is the characteristic in which the non-user has an opportunity to see what uses their colleagues are making of the new technologies, and to hear about both successes and failures in order to learn from others' experiences. Sharing success stories is not usually difficult to encourage people to do, but encouraging people to talk about unsuccessful experiences is more challenging. Observability opens the user up to the scrutiny and potential for both praise and criticism from students, colleagues and anybody else who happens to look.

Some interesting observations were made in passing: the general learning technology skill level in the department was variously described as “a real continuum in terms of people’s abilities” (Interview 14) and “amazing ineptitude” (Interview 3). An element of this “ineptitude” is due in part to inexperience in using the technology itself, and in part to the relative lack of models available for faculty members and students to see how the technology might be effectively employed.

Demonstration

The Faculty of Education has recently launched a number of online graduate-level initiatives, which are only possible because of developments in learning technology. This new capacity creates “incredible solutions to problems that, before, we couldn’t figure out. And it creates new problems.” (Interview 7) Some of the problems relate to the technology itself, like those that arise when servers crash, or when individual participants
experience technical difficulties, but other problems relate to the design of the curriculum and the workload that is created for the instructor when they feel an obligation to respond to every online posting that every student makes. None of these problems are, in themselves, insurmountable, but if they arise too often, they discourage participation in similarly conceived projects. Success breeds success, so as an observer commented, “Once there’s been a bit more history and they demonstrate their success, there’ll be even more commitment to them” (Interview 12).

Application of the appropriate learning technology is a critical factor in terms of observability: learning technology applications can be effective presentational tools, but more than one participant in this study observed that they have seen PowerPoint presentations in which “the technology ... took over and the message kind of got lost” (Interview 4).

What may not be being lost, for many who are using learning technology either to support or supplant face-to-face discussions or debates, is the quality of the interaction. Several participants commented that they understood web discussions to be similar to seminars in what they could accomplish and how they could be structured, and that the quality and depth of the discussion is probably as good on-line as it is in a face-to-face classroom situation. “It’s pretty powerful medium if used appropriately” (Interview 9).

Learning technology offers the potential for the user to use a live connection to the World Wide Web and use the Internet as a live resource to prove the point or explain the concept they are striving to communicate. No examples of such an advanced use were forthcoming from the group of participants, however, and one faculty member commented, “I don’t know anyone who’s systematically using our web connections with
a notebook computer to actually go onto the web during class and visit different sites, and
do things of that sort” (Interview 9).

Risks and Benefits

Although learning technology offers many potential benefits, “the risks far outweigh the benefits” (Interview 3) for many faculty members. The risks are several, and include, but are not limited to, the risk that the technology will fail to start as required or that it will quit at some point in the midst of use, or that it will create and then further exacerbate misunderstandings or miscommunications. As one faculty member put it, “I’m not suggesting that technology always misfires, but I’m sure all of us can think of more times when it did than it didn’t” (Interview 15).

Learning technology offers the lecturer the potential to engage their audience more intensely by stimulating more than just their audience’s sense of hearing, but it also has the potential to distract the audience’s attention away from the lecturer entirely. When everything is working properly, learning technology can provide additional context in the form of visual images or sound. But when it is not used well, or when it breaks down completely, it can completely derail both the presenter and the audience:

I like when I see somebody use it well. When I see someone use it badly; when the equipment doesn’t work; when it isn’t compatible, and we get so focused on the bloody laptop we don’t listen, we don’t look at other people. And that happens a lot (Interview 7),

Every time I try to use a computer in the classroom, I run the risk of it failing and then it disrupts the entire class … any good teacher will tell you, the worst thing that can happen in a class is not to be prepared. Then when technology lets you down, that’s the ultimate slap in the face of lack of preparation, because it’s not that you didn’t prepare, but it’s the technology that didn’t allow you to be prepared (Interview 3).
One participant stated that "new technologies aren't reliable, and the support isn't there" (Interview 3), while another observed that the "bumbling around with the technology" (Interview 14) might well be "a major drawback for a lot of people" (Interview 14).

A critical characteristic of observability is that non-users have an opportunity to evaluate the potential of the learning technology without investing their own time in learning what uses may be made of it. PowerPoint presentational software has been observed but not used by many of the faculty members consulted, and the perspective on its value included such comments as

I’m not sure PowerPoint is a huge improvement over overheads, given the amount of time and energy you have to spend getting it organized (Interview 14),

and

I can't say I was ever impressed by all the PowerPoint stuff, and I just thought it was mostly doing in a more glamorous kind of way what you did on the chalkboard – they’d occasionally load a picture into their computer, but it didn’t look any better than a slide to me (Interview 15).

One faculty member who resists using presentational software expressed concern at a more strategic level. This concern focused on the relative value of learning technology in allowing the students to construct their own knowledge and to engage in debate about what constitutes knowledge: "the disadvantages, both theoretically and practically, with technology tend to enclose you" (Interview 18). As another faculty member observed, "the whole field is associated with a high level of promise and a low level of delivery. If we can, in fact, take the best parts of our teaching/learning combinations, and use the technology to advantage, that would be great" (Interview 17).
Faculty members react to the introduction of learning technologies in accordance with their own personal beliefs about its value and relative merit:

I think at the graduate level, the seminars and the conversation is more important (Interview 16),

it would be far different if I really felt the need to engage with students who were not able to be here physically (Interview 12),

it’s investment and a huge amount of money for things that most people won’t use. I think doing a good needs assessment [is necessary] (Interview 3),

I’m not convinced that the technology excitement around post-secondary education has improved access. It’s opened up new markets; it’s all about the corporatization of learning (Interview 7),

[the way] I would assess it is word of mouth from people I trust, but I would be asking a lot of questions about what exactly it did, why they liked it, what it provided, what were the trade-offs, that kind of thing (Interview 6),

if we really cared about students, we’d be spending a lot more time on things other than technology. It’s about toys rather than real concern about the students (Interview 15).

**Communication Channels**

The channels through which faculty members learn about learning technologies influences both their perceptions of the learning technologies themselves and the likelihood that they will be willing to try them out. Communication channels may be formal, such as courses, workshops or seminars on general concepts or specific “how-to” training sessions, or they may be informal discussions about an individual’s plans for using learning technology or a question between colleagues about how to approach a situation that may have a technological solution.
Training Opportunities

There are several resources for learning technology training available to faculty members in the Faculty of Education; the Education Computing Services (ECS) unit of the Faculty of Education, and the Centre for Teaching and Academic Growth (TAG). Each of these units offers workshops, institutes, and other training opportunities for faculty members on a variety of teaching and learning technology themes. However, these formalized learning opportunities do not suit all preferences: the need to learn about learning technologies has to grow organically. People have to have a need for the technology. They have to be motivated to want to use it for a particular purpose, not just simply because it's there. It has to make something they do better or easier (Interview 19).

However, the type and availability of support for those with a motivation to learn about learning technology influences their interest in pursuing it further:

I've been to a two lunch-hour session on WebCT for faculty members, and that was very useful. One would probably need a little more time to become good at it. I have then used some time to work with it myself, and then I had the assistance of Education Computing Services to come down for an hour or so to help me with all the questions that I have (Interview 2),

I thought about taking the PowerPoint course, but I saw people using it, and I'm not that impressed. I'm not going to bother (Interview 15),

the instructors ... were outrageously terrible. I don't know what they're like now, but the ones who were teaching the computing courses were absolutely terrible ... quite a long time ago (Interview 3),

I decided at one point that I really wanted to explore WebCT, then I was told that they wanted to train staff rather than faculty, and I thought that's really stupid. It would make sense to have staff and faculty go together so faculty know how it can be used and the staff could actually do it for them (Interview 16),

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I did try to sign up once for a WebCT course – there was a message sent to all faculty looking for participants and I tried to sign up immediately, but then I was told that no, they changed their mind. They were going to send our two computer technicians to it instead (Interview 3).

Whether the hindrances are personal or structural, the faculty members’ underlying beliefs about how learning about learning technology should occur ultimately fuel their perceptions. In an environment where a feeling of being overloaded is so frequently cited, it was not surprising to hear expressed the sentiments

Time is a serious problem with technology. I resent the time you have to give to learn – and you really do have to give the time to learn (Interview 20),

I’m not opposed to it, and would certainly be willing to learn how to use those technologies if and when the need arises (Interview 12),

but

if I don’t need to learn it I’ve got enough other things to do, thank you very much (Interview 12).

**Learning Environment Preferences**

In the same way that individuals have a learning style that suits their personality and personal style, faculty members have decided preferences for the ways in which they are comfortable exploring learning technologies that are new to them. Individuality is a hallmark of academe, and faculty members’ preferences for learning is no exception:

if I was informed about it and somebody gave me a workshop and I saw the value in it (Interview 6),

and

the trick is to find good courses (Interview 3).
"I just find that I'm happier learning on my own" (Interview 3) was not an uncommon response to the question formal learning technology training.

Many of the participants in this research indicated that they were familiar with the workshops and institutes offered through the campus Teaching and Academic Growth unit and the faculty's Education Computing Services group, and felt that if I had the time and the inclination, I could go and talk with them (Interview 9),

or

it's much more efficient, with all these demands on our time I just teach myself, and if I need help I'll ask someone. But you can figure it out (Interview 5).

When faculty members have difficulty "figuring it out", their expressed preference is to seek assistance from trusted colleagues and associates who can answer questions or demonstrate possible solutions, or "having a network of people who you know know. So that way you don't have to know it; you can go get some advice." (Interview 14) because "the more you know, the worse it is" (Interview 14); if you're the one who knows, you're the one people come to with their questions.

Collegial support and mentoring is a practical way of supporting faculty members as they learn about learning technology: "If I team taught with somebody who's really red-hot on it, and then I might see the possibilities" (Interview 14). As another participant expressed it, they would be interested "in an efficient description or sharing of examples of neat things that are being done, because I would like to learn from my colleagues about good ideas" (Interview 6).
Many participants spoke of the ability to observe their colleagues’ use of learning technology as their preferred communication channel, which requires that the appropriate models be readily and publicly available.

I guess I don’t have any models in the department that I would acknowledge as particularly good teachers because of their use of technology. I think there are some excellent teachers in the department [one of whom] doesn’t use any technology other than a pen… [another of whom] is a highly organized person, she’s very lively, she’s very focused, and so I think all those qualities make her a good teacher whatever she used (Interview 15),

but

I didn’t hear [from students] that there was all this wonderful stuff happening with technology that we should all stop whatever we were doing and do something with it. And when they were telling me about who were the really good teachers in the department, technology never came up (Interview 15).

Faculty members who participated in this research were not reluctant to share their visions of what would, for them, make a good environment in which they would feel comfortable learning about learning technologies. The environment should be flexible, because “your interest in a particular kind of technology or a particular idea which is technological based tends to be temporal in the sense that it happens in a particular point in time” (Interview 8). Also, “people are at such different stages” (Interview 16) in their familiarity and comfort with learning technologies that at least one participant “would want people to be really available, to talk to me and find out where I am and what I know already, and fill in the holes, so that as a faculty member I can do what I need to do” (Interview 16). This individualized learning environment would be expedient and provide the faculty members with the tools they require to accomplish their goals,
supporting the desire “to learn what I need to know so I can do what I need to do” (Interview 16).

**Time**

Rogers identified time as the third element in the successful diffusion of an innovation, but it is not a significant factor in this particular instance. "Time" is not related to the physical passage of time, but rather to the decision-making process through which the institution chooses to diffuse the innovation: optional, collective, or authority. The institution’s senior administration has adopted an optional approach toward learning technology adoption and use, so time is not a meaningful or significant factor in this equation.

**The Social System**

University culture is built on the values and standards of its constituent faculties, and the culture of the faculty is built on the values and standards of its constituent departments. Leadership in the University culture, therefore, needs to be consultative and respectful of the requirements of its constituent members to increase the likelihood that individual faculty members will embrace and actively support the institution's initiatives. This is most likely the rationale for adopting the optional approach to learning technology diffusion.

Learning technologies are the most recent developments in instructional techniques, and are challenging both instructors and students to make effective and constructive use of them. Many factors, including the general "graying" of the faculty
and the rapid adoption of learning technologies amongst students, inform progress toward this goal, and "nowhere is that age gap ... more dangerous than it is in terms of the way that academics relate to technology and the way that their students take it for granted" (Interview 8). This technological imbalance may create some short-term challenges while student and faculty expectations about and use of learning technologies reach equilibrium.

In establishing this equilibrium, it is important that leaders of this process not rush into encouraging or requiring faculty members to use learning technologies that are not appropriate to the task at hand. One participant observed that there is an incredible amount of pressure, incredible set of assumptions from the top, that all faculty are going to be involved in learning technology, and all faculty are going to embrace it wholeheartedly (Interview 8), a set of assumptions which this research has proven is not yet the case, although another participant noted that "UBC, I think, was really getting quite behind in the use of technology for instructional purposes" (Interview 9).

In addition to the hesitancy that faculty members exhibit in relation to adopting learning technologies, "there are some interesting political and ethical issues that really haven't been discussed in relation to learning technologies; or they have been discussed in small, quiet circles that I think will eventually need to be talked about in more detail here on campus" (Interview 9). These ethical and political issues include resistance ... to the notion of using technology to cross cultural boundaries, and there are clear ethical and other issues about turning UBC into a place that might sell its courses all over the world (Interview 9) and concern that technology is detrimental in some ways to social development. That it forces people to become isolated, more individualistic, having less need to
engage face-to-face with one another, those kinds of things. And also, some would see computer technology as being pushed on educational institutions by the corporate word, the purpose being to achieve a corporate agenda (Interview 12).

Each of these factors contributes to the development of a culture in which it’s very easy to work in relative isolation... we go away to conferences and we talk to colleagues from everywhere else about what we’re up to, and make some really interesting comparisons there, but that tends to be where it ends (Interview 17)

They also contribute to a cynical sense amongst some faculty members that the University wants to "look good on the teaching front, but they don't want to invest in ... all the ways teaching could be meaningful" (Interview 15).

*Current Directions*

Departmental discussions about learning technologies are infrequent, tend to focus on problems, and are reported to be more about management and administration than philosophical or pedagogical discussions about the value and quality of teaching and research:

there's a kaleidoscope of conversations that happen, and technology's one of them (Interview 11),

discussions tend to be about filling a gap; making up for a shortfall (Interview 18),

I don't think we've had what I would call an intellectual or pedagogic discussion about the use of technology (Interview 18),

and

I don’t think there’s any place or any occasion to share those kinds of insights. In terms of settings that encourage those discussions, they’re absent. I don’t know quite in what form they could be made available, but
I think if there were forms in which they could be made available, it would
in fact be very useful (Interview 8).

On a pragmatic, planning level, concern was expressed that the Faculty is
putting in wireless technology without any sense that our wired
technology doesn't work (Interview 3)

and that, as a faculty,
we need to get a grip on what we're doing (Interview 3).

The fact that the installation of wireless technology in the Faculty buildings is perceived
to be a faculty initiative, when in fact it is part of an institution-wide initiative that has
simply reached one of the Faculty buildings before others is evidence that a Faculty
strategy relating to learning technology either needs to be created or, if one exists, needs
to be more clearly communicated to all members of the Faculty.

Faults in the Current Learning Technology Strategy

Participants in this study identified a number of faults or failings in the current
learning technology strategy. Looming largest among these is the sense that learning
technologies are being adopted not for their academic value, but for their novelty:

Some of the technology stuff that I've heard people talk about just strikes
me as a novelty that I'm not so sure that it enhances the learning, unless
it’s the learning about technology (Interview 6).

This sense may be exacerbated by the lack of opportunities for colleagues outside of
specific project groups to discuss the uses that have been made of learning technology,
and to hear from the project teams about what has worked and what hasn’t.

There is a very real sense of frustration among faculty members in this
department that there are no coherent standards of what technologies can and cannot be
supported by the faculty’s Education Computing Services team. This frustration has led, in some cases, to a sense that

we need somebody who is a real supporter of technology in education, and who wants the best for faculty and students; instead of telling us what we can’t have, telling us how to get what we need (Interview 3).

The sense that “it’s all talk and glitz, and it’s not concrete action and reality” (Interview 3) is a theme that runs through some of the discourse. What is required is “not technology for technology’s sake, but for the way in which it moves and facilitates the learning” (Interview 6).

The Dean has formed an Advisory Committee to work with him on policy and strategic directions for the faculty’s learning technology activities. Within this committee, "the major thrust is to see technology as a way of enhancing learning and extending the content of learning" (Interview 14), yet participants expressed opinions that there's this kind of “rah rah” leadership about wireless technology without any sort of indication of what is needed, or what is wanted, or what will be used, or what will be out of date in 2 years or 10 years (Interview 3), and

you can’t always get into it because there are eighteen items on the agenda. After a while you get silenced because if you keep raising these critical questions ... nobody wants to add those or cares to listen to those questions because people are moving ahead anyway (Interview 7).

In any committee structure, it is difficult to ensure that everyone in a diverse community feels that their concerns have been heard and will be considered, and the challenges facing this committee are no different. One participant acknowledged this complexity:

I understand that not everybody's opinions can be acted on, but I'm talking about openness to hearing them and considering them (Interview 16).
During the course of conducting the interviews for this research, it became quite clear that the Dean’s Advisory Committee has been working hard on these issues, but has more work ahead of them to bring the reluctant and skeptical faculty members to a position of support for the Dean’s agenda.

**Funding Structure**

The funding structures that support the integration of learning technologies into the instructional work of the faculty members is challenged in several significant ways. The first is the nature of the current provincial premier’s political agenda concerning access to education, and the other is the nature of technology itself. The following two observations are concise summaries of these influences:

the political platform that gets votes is saying we’ll create more spaces at the University for kids to come as they graduate from high school, and that’s fine, but that’s not the only place where we need spaces and money and technology and expansion (Interview 16),

and

the trouble is that technology is this thing that’s going to run us over – we all have to keep updating (Interview 15).

**Faculty Funding Priorities**

The faculty’s senior administration has identified a series of funding priorities that are consistent with the goals outlined in the University’s Trek 2000 vision document, and are moving steadily toward fulfillment of these objectives. Several criticisms have been leveled at these priorities:

the University wants us to teach with it and they’re not getting it from other places – in other words, they should provide it (Interview 4),
computers are part of our job: it’s as or more important than a telephone, but they’re not supplied like telephones are. Why aren’t computers considered basic office equipment? (Interview 3),

and

I can understand why there needs to be, maybe a core of things that are supported, and some things that aren’t, [but] not everybody’s alike, and that’s something we’re supposed to understand in this department (Interview 3).

Resources and strategies for equipment acquisition and maintenance are insufficient, and the contrast between the levels of funding and the levels of expectation of use are incongruent:

When you first arrive, you’re told you get whatever you want, but after that you have to apply for money, and that money is certainly not available on a regular basis (Interview 12),

money is essential, and technical support is essential and has to be there once a person makes a commitment to trying or using technology to support teaching and learning (Interview 19),

there is support around the University, but it’s hard work sourcing it. And it’s not systematic, and you have to pay for it. One way or another. Emotionally or financially (Interview 20),

it’s easier to go into the big, exciting projects rather than to build a good infrastructure (Interview 4),

you can get funded to design curriculum if it’s online, but you can’t get it if it’s something else. There’s a technology bias going on, but there’s no concomitant ongoing resources (Interview 7),

every time the administration gets worried that faculty members are behind the times in technology, another program comes up. But we don’t have a coherent [plan] (Interview 20),

and

if you don’t think this is important, fine – don’t give it a profile (Interview 19).
One participant categorized these contrasts as a form of "hypocrisy" (Interview 7), while another observed that:

there's a lot of other things that have taken priority; funding, staffing, economy, accountability, a number of those things. But certainly, frustration with the perception that Teacher Ed is getting the resources and that we're losing them in terms of the Teaching/Learning Enhancement and Equipment funds. So, there's more discussion reflecting that frustration than there is about who wants to jump on board (Interview 16).

This perception of an inequitable allocation of funds amongst program areas within the Faculty has fed the perception that "in the faculty there seems to be a lot of money available for the Dean's relatively narrow description of learning technology" (Interview 16).

*Department Priorities*

There is little flexibility in the Department’s budget to make up the shortfall and support the acquisition and maintenance of equipment for faculty and staff:

Our operating budgets are virtually non-existent; they’re so small there’s no way to use them to enhance any kind of hardware, let alone the software the staff needs on an annual basis (Interview 16).

Some, however, would argue that the lack of flexibility in the departmental funding structure has as much to do with priorities as it does with actual dollars available:

I think funding is part of it, but part of it is just departmental priorities, that there’s very little discretionary money that’s available in departments; it’s a pittance, actually. I think our priorities are often to send students to conferences to deliver papers, and to help buy new furniture for our classrooms – and we’re addressing those things first. And so, it’s both lack of overall funding for technology-specific initiatives, and just the priorities within the department that are the explanations for why we haven’t done more (Interview 9).
This line of argument could be applied in support of both the Faculty and wider University practice of allocating resources for learning technology initiatives; priorities are a significant element in an organization's funding model.

Grant Funding

Within the Faculty and the University, there are a bunch of technological innovation grants, where if you use — well, define technology as computers, including hardware as well as software — in your courses you can apply for money to develop those courses. Of course, if you want to develop those courses without technology, try finding support for that. It's more difficult.” (Interview 5)

“There’s lots and lots of soft money to purchase machines” (Interview 5), but by their very definition, those funding sources cannot sustain an on-going technology agenda.

“Funding is available in the form of small grants you can apply for, but it’s only a once-a-year proposition” (Interview 8), which raises other concerns:

   one of the elements of technology is when you want to do something, and something becomes relevant, it’s usually quite sudden (Interview 8),

and

there tend to be, in any department, the have-nots and the have-nots in terms of people who are doing research and have research grants (Interview 8).

Access to external research grant funding is becoming, de facto, a form of learning technology funding:

I’m lucky because I have research grants and I can get my computers and things I need (Interview 4),

most of that [upgrading operating systems and software] comes out of our own pocket, or out of our grant money. Even the toner cartridges: we pay for those. I have colleagues who say, I don’t allow students to e-mail me assignments because I have to print them out and it uses up my ink cartridges and that’s eaten up my grant (Interview 12),
anything I use I buy out of the grant I have on my own (Interview 16).

Research, then, and access to research grant funding, is a critical factor in faculty members’ ability to make use of learning technology.

Ironically, the people who are most committed to teaching sometimes are people who are disinterested or have given up on research. So they’re the really consummate teachers, and they’re the ones who aren’t going to have access to the kind of money (Interview 8), so they will become the ‘have-nots’ in the emerging academic culture. The faculty members who will have the power in the academy of the future will be the ones in command of the ‘soft’ research funds, while the faculty members who love to, and want to, teach will be the ones working with sub-standard equipment that does not serve them, or their students, well.

Conclusion

The issues relating to faculty definitions, perceptions and use of learning technology are many and varied. Most significant to this research is the strong sense of skepticism about learning technology and the institutional agenda relating to it. Faculty members generally prefer to define “learning technology” broadly, but are sensitive to the political forces within the institution that are narrowing the definition to refer primarily to the application of computer and online technologies to teaching.

Multiple factors influence faculty perspectives of, and willingness to adopt and use, learning technology in their teaching. These factors include the individual’s perception of the value of learning technology, the availability of equipment and support,
the appropriateness of learning technology to the curriculum they teach and the way they approach that curriculum, the additional workload they will face if they adopt and use learning technology, demonstrations they have seen of learning technology applications, the type and proximity of training that is available to them, and the cost they believe they will have to bear if they choose to use learning technology in their teaching. It is interesting to note that the participants identified few concerns about learning technology and their teaching style or activities, beliefs about teaching, or their personal epistemology. It is difficult to determine whether this is not a significant issue for this group of faculty members, or because this research did not specifically raise these questions.
CHAPTER 5: DISCUSSION OF RESULTS AND CONCLUSIONS

Introduction

This research project was inspired by a recent institutional undertaking to invite faculty members to provide input into the development of an institutional vision for the use of learning technology in teaching, and motivated by my personal experience both as a part-time undergraduate student and as a long-time member of the University’s Distance Education & Technology unit. In my work, I have provided support to instructors and students as new, emerging learning technologies have been applied to the distance education experience, and have participated in learning-technology based educational experiences as a student. This range of experience piqued my interest in the consultation process and resulting institutional plans.

The consultation process, as it was designed and executed, invited participation from members of all faculties on campus but appeared to attract participants who are positively oriented toward the use of learning technology in their teaching. It did not tend to attract participation from faculty members who are either ambivalent about using learning technology in their teaching or who are uninterested in engaging in the debate. As the consultation process engaged only 185, or two percent of the University’s approximately 9,000 faculty members, it cannot have captured the perspectives of the silent majority of the University’s potential users of learning technology. The consultation process sought and received feedback to the questions of how and why some faculty members would use learning technology, but neither sought nor received feedback about why they would not.
In order to probe the perspectives, both pro and con, that inform faculty members’ attitudes toward the adoption and use of learning technology in their teaching, I invited faculty members in an interdisciplinary department in the University’s Faculty of Education to share their perspectives on these questions. Semi-structured interviews were conducted with the participants, and analysis of the interview transcripts revealed a number of themes and sub-themes related to the nature of learning technology itself, the communication channels through which information related to learning technology is disseminated, the decision-making process related to encouraging adoption and use of learning technology throughout the institution, and the social system into which learning technology is being introduced. Based in Rogers’ Innovation Diffusion research model, this Diffusion Elements and Innovation Attributes model provides the framework for understanding how these elements influence the perception of the value of the use of learning technology in teaching in higher education.

Findings and Implications for Policy and Practice

Not surprisingly, participants in this study revealed that adopting and using learning technology in their teaching is neither completely good nor completely bad. The perspectives held by individual participants were informed by their personal experience using learning technologies in their teaching, by what they had read about it, and by their observations of their colleagues’ experiences with it. It was clear that all participants in this study had thought about the issues related to using learning technologies in their teaching and, regardless of whether they had first-hand experience making this type of use of technology, had formed an opinion of its utility for them personally.
Attributes of Learning Technology

Many of the participants in this study expressed the opinion that learning technologies, applied to the teaching situation, would be useful tools to facilitate instructor-student and student-student communications. Many of them are already using web-based systems to post their course outlines and schedules, and to facilitate the kind of administrative communication that is required in the educational process. A few participants have used WebCT or BlackBoard software to post course notes, and a rarified few have created and/or instructed a fully online course. Participants in the study who have used web sites to post course notes indicated that while the system was popular with their students, it was a significant amount of work for a small return for them. Those participants who have engaged in fully online instruction found the experience both engaging and exhausting.

The participants who described their personal experience in the online instructional environment expressed the opinion that the quality of the discussion and debate among the student cohort was of at least the same caliber as that experienced in their face-to-face classroom situations. While the potential exists for misunderstandings or misinterpretations to develop and escalate rapidly in the online environment, participants in this study expressed the opinion that it is a manageable risk, so long as the online instructor is alert to the potential and models clear communication skills themselves.

The unique nature of the online learning technology environment makes it possible to create, develop and offer new international teaching and learning
opportunities. The Faculty of Education’s fully online graduate programs, such as the Masters in Educational Technology or the Intercontinental Program in Adult Education, could not be managed readily through any other form of learning technology; neither videoconference technology, nor audioconference technology, nor traditional print-based distance education delivery methods can create the educational synergy and immediacy that the online environment has permitted. The success that the faculty’s online programs have demonstrated, and the lessons learned by the creators and instructors in these programs has stimulated interest in and discussion about the potential for use of learning technology in teaching amongst their colleagues and observers.

Communication Channels

Communication channels through which information about learning technology is disseminated are many and varied. Formal communication mechanisms such as conceptual workshops and seminars and “how to” skill development workshops, made available to all faculty members in an interdisciplinary forum, are a significant mechanism for change agency and further the organizational agenda by reaching a wide, interdisciplinary audience. However, as discussed in the literature, faculty members’ initial socialization occurs within the context of the area of content specialization, and may preclude interest in interdisciplinary learning opportunities. The preference for local collegial support and mentoring identified by the participants in this study supports the concept of discipline-specific learning preferences.

The demonstration of the potential for the use of learning technology in creating and offering fully online graduate programs has made the kinds and levels of experience
of these faculty members more public amongst their colleagues. The modeling of
different forms of curriculum development and instruction seeds the informal, collegial
network of interested faculty members, and encourages curious faculty members to
discuss and explore their own potential for adopting and using both online and more
traditional forms of learning technologies in their teaching. As the applications of
learning technology are many, and the situations in which they may be appropriate and
useful are varied, developing a variety of models and encouraging interdisciplinary
demonstration of these models would lend pragmatic, demonstrable support to the
communication of the potential for learning technology in teaching.

*The Social System*

University culture is built on the values and standards of its constituent faculties,
which in turn are built on the values and standards of their constituent departments.
Members of all these constituencies are also members of the larger world, in which the
impact of communication technologies is ubiquitous and inescapable: it is therefore
unimaginable that higher education would be immune to the pressures brought to bear by
the rapid development and deployment of communication technologies.

Curiosity about the potential that learning technology offers to the teaching and
learning relationship is supported by the general level of technological competence
demonstrated in this faculty group. All the participants in this study make regular use of
computers in their work-related communications: each one uses e-mail on a regular basis
in their collegial and research communications, and most participants also use e-mail to
communicate with their students individually. Many participants reported
communicating with colleagues locally, nationally and internationally regarding research projects, and many make extensive use of online learning technologies to further their research agendas. This level of active use for research indicates that the impediments to adopting and using learning technology for teaching is not so much a matter of lack of familiarity or comfort with the technology itself as it is related to beliefs about the appropriateness of learning technology in the teaching and learning environment, epistemological considerations, or structural impediments.

Key among the disincentives to using learning technology in teaching that participants identified is the existing funding structure. At a philosophical level, participants expressed frustration that while they are expected to adopt and use learning technology in their teaching, the funds available to support acquisition and maintenance of equipment and supplies are so limited as to be non-existent. Some faculty members permit their students to submit assignments electronically but return them to the students physically, which uses supplies like toner that are purchased using their research grant funds. Many of the participants who raised this issue indicated that they would be pleased to support their students’ use of online technology to facilitate learning, but not at the expense of their own ability to continue with the research for which they have received funding.

This de facto reliance on research funding to address practical issues related to the use of learning technology in teaching raised the concern that the lack of operational funding support for this activity will create a new and undesirable social structure of technological “haves” and “have-nots”, demarcated based on access to research funds. The irony of this situation was not lost on at least one participant, who noted that the
individuals who are the most committed to being excellent teachers are often those who have retreated from the research agenda and will, therefore, not have access to the “soft” funding sources that are fueling the learning technology agenda within the institution. The implications for students of this new social stratification were not lost on this group either: concern was articulated that although course web sites may be built, a proportion of the potential student population would be unable to access them if they could not afford the costs of equipment or connectivity.

Further to the question of access to the hardware and software to support the learning technology agenda is the question of access to the culture of technology itself. The literature reveals that communication technology has a unique culture which is most vividly represented by the use of “emoticons” and catch phrases. Familiarity with the significance of icons such as ;-) [wink], and shorthand such as “LOL” [laughing out loud] makes participants part of a culture with its own communication norms and standards. Without an understanding of the norms of this technological culture, participants are marginalized and may be misunderstood.

Another key disincentive to using learning technology in teaching identified by the participants relates to the kinds and level of learning technology support available to them through the institution. This support relates primarily to secretarial or technical support to help individuals scan materials, post them to a web site and troubleshoot technical problems either in the learning technology-enhanced classroom or web-based environment. The time of both the department’s secretarial staff and the Faculty’s technical support staff are fully, if not over-committed, so the lack of immediately-available support for the use of learning technologies fuels the sense among this group.
that adopting and using learning technologies in their teaching might provide some interesting additional means of communicating with their students but it will almost certainly increase their already significant workloads.

The workload issue, combined with the observed potential for technical failure, paints an unflattering picture of the adoption and use of learning technologies in their teaching for many faculty members. Having observed or experienced PowerPoint presentations that would not load properly or computer projectors that failed mid-presentation led many participants to the opinion that undertaking the preparation and development of materials that may cause more problems that they would resolve simply wasn’t worth the commitment of time and energy to the project.

One more significant issue articulated by participants in this study was the concern that if they undertook, on their own initiative, to become proficient in the use of learning technology in their teaching, they might become the de facto expert and departmental resource person for all their colleagues. This concern was motivated more by the previously articulated issue of workload than any lack of collegial spirit: participants in this study already feel that their time is fully accounted for by the research, teaching and administrative commitments they have.

Time

Rogers' concept of time as it relates to the diffusion of an innovation relates less to the concept of the physical passage of minutes and hours than it does to the process of making decisions about the adoption of an innovation. The decision-making processes he identifies are optional-, collective- or authority-based. The optional-decision process
leaves the decision to adopt or refuse to adopt up to the individual, while the collective-decision process involves establishment of group norms that members are then expected to adopt. An authority-decision process vests the responsibility for the innovation’s adoption with an individual in a position of authority, who then requires that all members of the social system adopt the innovation. The authority-decision process is the quickest way to ensure adoption, but is also the most likely to result in individuals creating ways and means to circumvent the process during the implementation phase. Both the optional- and collective-decision processes require more time than the authority-decision process to establish and implement, but are much more likely to result in considered, thoughtful and long-term adoption of the innovation. In this case, the institution has adopted the optional-decision process model.

The institution’s optional approach to the learning technology decision-making process encourages a non-imperative, evolutionary, collegial exploration of the issues, challenges and opportunities offered by learning technologies, and is likely to ensure success of this agenda over the long term. However, the very fact that the institution has taken this perspective on the learning-technology-in-teaching agenda means that leadership in and championing of this issue reverts to those who have a personal interest in this area. This structure, coupled with faculty members’ preference for personalized, or at least locally-available, support and expertise means that the impetus to adopt and use learning technologies in teaching will continue to rest with the individual faculty member.
Conclusions and Recommendations

The issues and concerns identified by the participants in this study outline a significant agenda for those responsible for learning technology diffusion among faculty members.

Learning technology cannot create a one-size-fits-all technological solution for all possible teaching situations: the combination and use of the learning technologies must be tailored to each faculty member, their pedagogy, their students, and their curriculum, and must be flexible in order to grow and develop as the faculty member grows and develops as an instructor. This model does not create an insurmountable challenge, but is one that requires a sustained effort, constant attention, and consistent human and financial support. Such a sustained and directed effort would enable the institution to create and maintain an interdisciplinary library of conceptual and practical examples of potential and successful uses of learning technology in teaching that members of the institutional and larger higher education community could borrow from as needed. Such a cataloging of examples would benefit not only a single specific department or faculty, but could be accessed by any instructional faculty member within the institution: the ready availability of examples could potentially stimulate exponential growth in the adoption and use of appropriate learning technologies. The results of such a project could also be accessed by other members of the provincial higher education community, and form another avenue through which the institution could provide leadership in this rapidly expanding area of provincial education system.

This is not to suggest that all faculty members should be constrained to make use of learning technologies they may believe to be unsuitable to their curriculum or their
instruction of it. However, it is important to recognize that there is incongruity between the institution's policy statements and practical structures: the Trek 2000 and Academic Plan documents articulate support for the adoption and inclusion of learning technologies in institutional teaching and learning activities, but the institutional commitment, in the form of funding, to the infrastructure needed to support the acquisition and use of these expensive and labour-intensive technologies is felt to be insufficient.

In order to fully re-evaluate the existing funding model and develop a revised funding model that would create stronger incentives and supports for faculty members who wish to adopt and use learning technology in their teaching, an analysis should be undertaken to identify and catalogue current activities that application of learning technology would amend or replace. Without reconsideration of existing teaching and learning activities or re-visioning of current pedagogical or epistemological assumptions about teaching and learning, it is unclear whether the adoption and use of learning technology can or will form a new foundation for the institution's teaching and learning activities, or whether learning technology will simply form a new instructional tool to be used by interested instructors.

I believe that to be effective, funding must follow function, so in order to re-evaluate the efficacy of the existing funding model, greater clarity of the vision for the future use of learning technology is required. The institution's current learning technology funding model, which relies heavily on "soft" forms of funding, supports the optional-decision process model. Expectations that interested faculty members will leverage their research funds, or access periodic project funding initiatives and small centrally-funded technology upgrade grants for faculty members are entirely congruent
with the expectation that faculty members will adopt and use learning technologies as individuals become interested in these questions. However, difficulty arises where theory and practice intersect: individual faculty members who develop an interest in exploring the use of learning technology in their teaching may not have the luxury of access to research grant funding to acquire equipment or other resources; they may not have the technological sophistication, or the time or desire to acquire the technological sophistication, to provide technical support to their students; they may not have colleagues who are willing or able to mentor them in developing their familiarity with the learning technology culture. If the institutional vision is to encourage and support its constituent members to adopt and use learning technology efficiently and effectively, a re-examination and re-evaluation of the mechanisms and structures that affect the adoption and use of learning technology must be undertaken to address the constituent’s concerns.

Developing new or re-developing existing mechanisms and structures to support ubiquitous adoption and use of learning technologies in teaching is a complex undertaking. Allocating human resources from a central funding source to support activities that are, by their nature, immediate and unpredictable, requires development and articulation of Faculty priorities and allocations that account for the needs of all constituent populations. In an economic environment marked by limited financial resources, coordinated strategies and frank discussion about availability and allocation of resources at all levels of the organization can both alleviate misunderstandings and create and sustain an environment in which shared experience is welcomed and encouraged.
**Future Research Directions**

The results of this study indicate some future research directions. The data from this study might be used as a basis to develop a survey for distribution to faculty across the institution to determine the degree to which the perceptions of the adoption and use of learning technologies reported here are commonly held. As this research focused on the perceptions of faculty members responsible for graduate-level education, and the question of whether the experience of faculty members using learning technology in teaching undergraduate students is different from the experience of faculty instructing graduate students, such a survey could provide additional insights into whether the level of instruction is a factor in the perceptions of the usefulness of learning technology in teaching.

Another important direction for further research is in the connection between epistemology and the use of learning technology in teaching. Pratt’s General Model of Teaching provides a framework for analysis of the elements of the teaching and learning equation, and invites exploration of the relationships between instructor, learner, content and context. It represents instructional ideals as central to the teaching-learning experience and, while the literature reveals a small amount of preliminary research in the area of the importance of epistemology to the likelihood that faculty members will be willing to adopt and use learning technology in their teaching, a deeper exploration of this area could reveal insights into more effective ways to encourage faculty members to conceptualize use of learning technologies in their teaching.

A third, and related, direction for further research is an exploration into the role and importance of opinion leaders and change agents in the diffusion of the learning
technology innovation. This research touched on this question only peripherally, and only in a general way: participants were not asked specific questions about any individual whose attitude toward the use of learning technology in teaching influenced them. Rather, a few passing comments from a few participants in this study about the degree to which their colleagues or mentors influenced their opinions highlighted this as a potential area for further study.

Finally, moving in a different, yet related, research direction, a study of student perspectives on the inclusion and use of learning technologies in their learning would provide an interesting and useful counterpoint to this research. Educators, by virtue of their responsibility for teaching material in which they have expertise, have confidence in their grasp of the demands of the material and what is required in order to teach it. Most programs, whether they are offered face-to-face or online, provide students an opportunity to submit evaluative feedback on the materials and instruction of a specific course or program, but rarely do they probe for qualitative feedback about the mechanism by which the material is delivered. Research in this area could provide some details of the other side of the teaching/learning experience, and could illuminate a different set of issues related to the adoption and use of learning technology in the educational exchange.

**Summary**

The purpose of this research was to explore faculty perceptions of, and experience in using, learning technology. During this process, I identified both the factors that tend to encourage faculty members to adopt and use learning technology in their teaching, and the barriers that they perceived as preventing them from doing so. The study uncovered
not only the host of pragmatic, day-to-day management issues that deter faculty members from adopting and using learning technologies in their teaching, but also explored external influences that may positively or negatively affect the likelihood that learning technologies will be adopted and used in teaching. This research has added to the body of literature about innovation diffusion through application of Rogers’ Theory of Innovation Diffusion in the academic learning technology context. The results of this study may be used to identify and promote institutional policies and practices that will address the concerns that faculty members have about the influence of learning technology on their teaching, in order that the benefits of the learning technologies can be maximized while the risks are minimized.

Much of the literature, as well as upcoming seminars and conferences, offers the perspective that the adoption and use of learning technology is a new paradigm. Through this study, I offer an alternative perspective: the more things change, the more they stay the same. The issues and concerns related to adopting and using learning technology in teaching, articulated by the participants of this study, show quite clearly that although learning technologies offer a different mechanism through which the teaching and learning interaction may be supported, underlying issues of how teaching and learning can most effectively and clearly be managed without increasing already strained workloads are not new. Indeed, “plus ça change, plus c’est la même chose”.

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Appendix C

Study of Faculty Perceptions of Learning Technology

Interview Agenda

Thank you and signing consent forms

Introduction

- MA student in Educational Studies (started in Higher Education) Also completed BA at UBC
- Have worked in Distance Education at UBC since 1981; began in student services area, now involved in administration (departmental and university liaison)
- Perceive that institution is taking strides in the inclusion/integration of technology in the classroom but wonder how much consultation actually happens with the faculty members who are being required to make the changes in their teaching (TAG workshops, report from the ACCULT committee, etc.)
- Am interested in personal career development in the areas of instruction and instructional design
- All this leads to the question, what are faculty perceptions of and experiences with the use of learning technology in their teaching

Objectives

- in a semi-structured interview format, to invite and encourage participants to talk about their experiences, interests, understandings and conceptualizations about teaching in general, and the use of learning technology specifically
- to focus in two particular areas that inform the subjects’ perceptions: their experiences (whether first- or second-hand) and their epistemological perspective

Questions

- list of questions attached

Wrap-Up

- any additional comments
- thank you
- follow-up actions
Interview Outline
Possible Questions and Information Sought

I’d like to ask you to think about a course, either one you have just finished teaching or one you have taught in the past, and describe the experience to me.
- What was the nature of the course (graduate or undergraduate? Early or late in teaching career?)
- What techniques were used to engage students with content (f2f or online?)
- How important was command of curriculum compared to relationship with students
- Is flexibility in adapting to student needs expressed as a factor
- How are roles (instructor and student) described
- How are beliefs about knowledge (objectivism – subjectivism) expressed

Now I’d like you to think about your students; either students you have just finished teaching, or students you have taught in the past. How would you describe them to me?
- What brought them to mind first
- How are interactions with them characterized
- What made these interactions significant to you as their instructor

Other than successful completion of a formal assessment tool (paper, exam, etc.), are there other indicators that let you know that a student has mastered the curriculum? How are these indicators revealed to you?

With these factors in mind, how have you used, or would you envision using learning technology in support of your teaching and your students? If you have used learning technology in support of a course before, how would you describe the experience?

How would you define “learning technology”?

If you have used learning technology in support of a course before, what encouragement or support was available to you?
- organizational
- personal

If you haven’t chosen to use learning technology in support of your teaching, what discourages you from trying it?
- organizational
- personal
- technical
- expense
- trialability
Given the discussion about technology in general at the University, is learning technology discussed much in your department?
- If yes, how is the discussion described
- If no, what indications are provided to explain why not

On a much more personal note, have you ever participated in a technology-based course or workshop?
- How is the experience described
- Does it inform the respondent's perspective on learning technology in their teaching
Table 1:

Participant Demographics

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<td>55%</td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>45%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By Area of Specialization:</th>
<th># Participants</th>
<th>% Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Education</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Educational Administration</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>Educational Anthropology</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Higher Education</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>History of Education</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Sociology of Education</td>
<td>6</td>
<td>30%</td>
</tr>
</tbody>
</table>
Table 2:

Frequency of Use of Learning Technologies as Identified by Participants

<table>
<thead>
<tr>
<th>Type of Technology</th>
<th>Incidence of Use</th>
<th>Frequency of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Mail: 1-1</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>Overheads</td>
<td>13</td>
<td>65%</td>
</tr>
<tr>
<td>Video/Film</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>E-Mail Listservs</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>Internet searches</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>WebCT</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>PowerPoint in class</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>Blackboard software</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Visual Images*</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Online Discussion Boards</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>Teleconferences</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>CDs</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

* includes use of slides and photography