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The Adoption of Asynchronous Online Courses by Professors at Memorial University of
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The Adoption of Asynchronous Online Courses
by Professors at Memorial University of Newfoundland:
A Case Study

by
Scott Reid

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Abstract

This study examined the experiences of university professors at one university as they adopted and used online courses. It drew on various theories of change to analyze the adoption of online courses by professors. Qualitative methods, involving semi-structured interviews with 32 university professors, were used to gather information about the various factors influencing university professors' adoption of online courses. Three levels of analysis—societal, institutional, and individual—were used to organize the qualitative data. The findings provide insight into the adoption experiences of professors at this university and also the future development of this new technology for teaching. These insights expand understanding of this new teaching medium for professors, university administrators, and researchers undertaking work in this area. Avenues for further research are also identified.

CHAPTER 1

INTRODUCTION

Online courses are a relatively new method for offering educational opportunities and the format of this mode of educational delivery is still being developed and refined (Carr-Chellman & Duchastel, 2000; Fong, Cheung, Leong, & Li, 2002). Research is necessary to obtain a general understanding of how this format is evolving and how university professors come to use this new technology. Many people are predicting that the introduction of online courses and information technology has the potential to transform the learning environment (Bates, 2000; Cornford & Pollock, 2003; Duderstadt, Atkins, & Houweling, 2002; Pittinsky, 2003; Tiffin & Rajasingham, 2003; Von Hippel, 2005). The experiences of universities and individual professors that are presently offering online courses will provide valuable insights for others as they make decisions about the adoption of online courses.

The concept of adoption, in its simplest sense, involves the acceptance of a practice or usage of an item. In change theory, the concept of adoption becomes more complex as factors, such as level of adoption, voluntary or coerced adoption, discontinuance after having adopted, and variations in individual adoption inclinations, are examined. In many theories, "adoption" is seen as a terminal event but, in recent years, with an increased pace of technological change in many fields, scholars are introducing the idea of adoption as a continual change process rather than a one-time event (Senge, 1990).

For this study, a general concept of adoption is used to allow maximum flexibility in examining the findings. Professors are considered to have adopted online courses if they have taught at least one course online. Similarly, a general definition of online courses is employed to include the many variations that exist. While narrower subdivision by variables such as subject area, class size, level of the course, and methods used may provide valuable insights upon further analysis, a broader perspective can be

gained by examining a wide variety of online courses. With this in mind, an inclusive definition of “online courses” is used to allow for the exploration of issues related to the different ways in which professors use these courses and how they continue to innovate once they have started teaching online. In this study, online courses are defined as courses where the primary means of delivery is through applications such as Web pages, e-mail, or electronic discussion forums. This format might also include streaming video or other tools of the World Wide Web (WWW). The online component may be supplemented with CD-ROMs, videotapes, or textbooks and the evaluation may, or may not be, conducted online. This study does not include classroom courses that have an online component; rather it focuses on fully online courses with no face-to-face interaction as well as on asynchronous online courses. It does not include real-time video courses or “immersive world” formats, such as learning through “gaming.”

Bijker, Hughes, and Pinch (1989) noted that the term “technology” is a very difficult one to define. It can be understood as a physical object or artefact; it can refer to an activity or a process; and it can be used to refer to the “know-how” that goes into designing things. In many cases, technologies involve a change in technique. Tenner (2003) made the distinction between the terms “technology” and “techniques,” where the former refers to something that modifies the environment and the latter involves modification in performance. In making this distinction he draws on the work of such noted academics as Jacques Ellul, Lewis Mumford, and Marcel Mauss. To clarify his distinction, he provides examples of the use of early weapons. While the earliest form of the musket was a new technology, it evolved with it new techniques in battle formations and drills that allowed for repeated firing. Also, some innovations involve only technique in that they require no physical artefact. For example, the Heimlich manoeuvre, as a way of dislodging a foreign object from the windpipe of a choking victim, is such a technique. Again, in this research, the concept of technology is used in a way to include both these distinctive aspects of technology.

Background

Many researchers in the field of computer science laid the foundations for the development of the early Internet and its precursor, known as ARPANET (Advanced Research Project Agency Network). Initiated in 1969, ARPANET connected computers at only four universities but expanded in a few years to connect universities in North America and eventually around the world. This network received government funding and was initially designed to ensure that a communication network would continue to exist in the event of a nuclear attack. The early version of the network was difficult to use and, at the time, there were no office or home computers so only a few computer experts, engineers, scientists, and librarians had access to it. In 1972, e-mail was first used over the network and this allowed individuals to exchange messages with each other. In 1973, protocols were developed that enabled users to log on to remote computers and share information. The development of Unix to Unix Copy Protocols in 1979 played a significant role in expanding the number of users because it led to the creation of Usenet newsgroups that facilitated discussion on many topics. Such developments of the Internet for purposes other than those originally intended is an example of how social forces can shape the use of technology (Murphie & Potts, 2003).

During the 1980s, the technology continued to advance while also becoming easier to use. This combination led to increased availability of online resources. The growing challenge at that time was to develop tools quickly to help index and manage the expanding amount of material that was then online. This pressing need led to the development of programs such as Archie at McGill University in 1989 and Gopher at the University of Minnesota in 1991, which made it easier to find material online. Also, during this time Tim Berners-Lee and others at the European Laboratory for Particle Physics were devising a system to embed links into text. Their system became the basis for the WWW. In 1993, a team at the National Center for Supercomputing Application, which included Marc Andreessen, developed a graphical browser called Mosaic that

made it much easier to search the Web. Andreessen later founded Netscape Corporation, which produced the most popular browser of the 1990s. The Netscape browser remained the most common way of linking to the Internet and did not face significant competition until Microsoft's Internet Explorer was integrated into Windows in 1998. Another trend that developed during the 1990s was that commercial online service providers, such as Delphi, America Online, Prodigy, and CompuServe, started offering Internet access to subscribers. The Internet was thus transformed from a research network accessible to relatively few people, into a worldwide resource utilized daily by millions of individuals and companies, and serving as a venue for many commercial activities (Cassidy, 2003). Today it is estimated that more than one billion people use the Internet worldwide (Computer Industry Almanac, 2006; eTForecasts, 2006; Internet World Stats, 2006).

In recent years, Internet usage has continued to evolve. High-speed connections that support multimedia, including sound and video are rapidly becoming predominant. Wireless connections have also become more prevalent in the past few years with many buildings, businesses, and university campuses providing such service. The devices people use to connect to the Internet are also changing as compact computers, handheld computers, and smart phones are becoming more common (eTForecasts, 2006; Goldberg, 2004).

The emergence of online courses is closely linked to development of the Internet. As professors and students started to use e-mail and other applications of the Internet, some professors began integrating online material into their teaching. With the advent of the WWW, professors began constructing Web pages for their courses and integrate tools that allowed them to offer courses online. In 1995, Murray Goldberg, in the Faculty of Computer Science at the University of British Columbia, started to experiment with the use of Web-based applications. In the process of designing an online course he realized that, because of the technical skills required and the time and costs involved, it would be difficult for sophisticated online courses to gain widespread acceptance and use

(Goldberg, 1996). In order to alleviate this barrier Goldberg designed WebCT, a courseware package that made it easier for professors to design and build their own online courses. This software eventually became one of the most popular of its kind. The small company started at the University of British Columbia was purchased by Universal Learning Technologies in 1999, which in turn merged with its major competitor Blackboard Inc., in February 2006. Other learning management systems are also currently available and some, such as Moodle and Sakai, use an open source distribution model.

In recent years, continuing developments in information and communication technology have occurred. For example, many developments are happening in the field of “social software” (Alexander, 2006; Bryant, 2006; O’Reilly, 2005; Tapscott & Williams, 2006; Weller, Pegler, & Mason, 2005). Included in this category are such communication tools as blogging, audio conferencing, instant messaging, wikis, Voice Over IPs (VoIPs), and social bookmarking. The possibilities for integrating these relatively new forms of communication into education are still being explored. Complementing these developments in software are the many advances in hardware available to students and professors. Smaller and more powerful notebooks, cellphones, and other devices are now less expensive and commonly used in society.

In terms of social software, one of the most widespread and rapidly growing innovations is blogging. Brescia and Miller (2006) examined the elements and characteristics of blogs and how they might be used as effective educational tools at the post-secondary level. They surveyed educators who use blogs to determine how they could be used as effective educational tools. Faculty members at various universities were able to provide clear examples of how they thought blogs could be used to support student learning. They noted that there are still a lot of unanswered questions about how blogs can best be used in education. Some faculty members claimed that blogs are a positive addition to learning because they are open to a wider public and therefore require

students to present their views in a more coherent way. Furthermore, since blogs are often an expression of personal opinions and feelings, they require a level of reflection. Tosh and Werdmuller (2004) commented on the reflective nature of Weblogs and their value in education.

Another practice to rise in prominence on the Internet in recent years is “social bookmarking.” Social bookmarking is sometimes referred to as “mob indexing” or “folk categorization.” Bookmarking is the process of saving Web site addresses and tagging them with keywords and brief descriptions. These kinds of bookmarks originated with people who used multiple computers and wanted to access their bookmarks from whichever computer they were using. Eventually these bookmarks took on a social aspect as people allowed others to view their bookmarked items. Further, the descriptors or “tags” used to describe the contents of the bookmarks can be freely chosen by users without using a shared vocabulary with other users. These means of spontaneously organizing are referred to as “folksonomies” because the tagging system is created within the Internet community by “folks,” rather than professionally developed with controlled vocabularies. Two of the most popular Web sites using folksonomies are *Flickr* and *Del.icio.us*. Some people predict these tagging systems will evolve into an alternative to search engines since they allow users to organize material in ways that make sense to them. This kind of gathering, storing, and sharing of information presents possibilities in education and is currently being examined in that regard. Hammond, Hannay, Lund, and Scott (2005) reviewed some of the recent developments in social bookmarking and explained how they might be applicable in education. They concluded that the future of social bookmarking is unclear at this point, but they see it as a “road ahead” that beckons.

Another fast growing type of software, which seems to hold potential for use in educational environments, is wikis. These collaborative Web-based sites allow “open editing,” which essentially means that the information on a wiki can be changed by any user. The most popular of these sites is *Wikipedia*, the largest encyclopaedia on the

Internet, with close to four million articles in more than 100 languages (www.wikipedia.org; July 2006). The educational potential of wikis has been discussed in the scholarly literature. Ferris and Wilder (2006) advocate the use of wikis as a teaching and learning tool. They claim that wikis build on the strength of the print paradigm that has dominated education since the advent of the printing press. Wikis also enhance the strengths of the “secondary-oral paradigm” that is emerging as technology savvy individuals become more comfortable with using information and communication technology. While the credibility of information in public wiki formats has been challenged, Ferris and Wilder make the point that the software itself has enormous potential for facilitating collaborative work and also for demonstrating how information is organized in a changing environment.

Some early research has also examined the use of text, audio, and video messaging services in educational environments (Hedin, 2006; Nicholson, 2002; Yin & Trinidad, 2005). Hedin (2006) examined how the use of mobile phone messaging services using text, audio, or video can be used to enhance university teaching. In an attempt to understand what services students would find most useful, and to determine how such services could be offered, students and professors were equipped with mobile phones and professors experimented with various strategies to support student learning. The professors found that students appreciated services such as notifications of changes in course schedules and reminders of deadlines. They also found that the advanced material related to an upcoming class was popular among students. Students reported that they preferred receiving messages as text files rather than in the audio or video format. However, this preference may have been due to the limitations of the technology that was available to produce and send this type of file. Hedin also noted that additional research is needed to examine how “studying in fragmented time” impacts learning.

Nicholson (2002) examined the impact of instant messaging in otherwise asynchronous online courses. His research shows that the use of such messaging led to

improved communication and a stronger sense of community and affiliation with the university. The work of Yin and Trinidad (2005) also demonstrated that teacher-student relationships can be enhanced in an environment where young students adept at using such communication software are involved.

The research conducted by Hampel and Hauck (2004) demonstrated that the usefulness of a particular technology is often determined by subject area. These researchers have shown that, despite some problems, audio conferencing can be successfully used to enhance distance language courses. These studies on the use of instant messaging in education support an earlier study carried out by Nardi, Whittaker, and Bradner (2000). The work of Nardi et al. shows that not only does instant messaging support “interactions” related to the communication tasks, but it also supports “outeractions” in which people “reach out” in a social way. While he recognizes the possibilities that exist and that students have an “information age mind-set,” Farmer (2003) cautions that the use of instant messaging also brings with it potential problems that are not yet fully understood.

Bills et al. (2006) focused on the availability of new hardware and discussed ways in which scholars can effectively use information and communication technology to assist them in their work. They hope to contribute to the understanding of why there is a lack of technology utilization in academia, in particular in the social sciences. While recognizing a considerable amount of suspicion exists among many scholars regarding the use of information and communication technologies and the way they encroach on individuals’ lives and autonomy, they also point out that digital technologies are now “firmly embedded into the rhythm of day-to-day life.” Bills et al. noted that wireless technology is valuable as it allows individuals to save time and overcome the restrictions of space. As mentioned earlier, wireless “hot spots” are becoming more common. Many airports, hotels, restaurants, and other venues offer public access to wireless networks.

Another major component of the mobile scholar is the Universal Serial Bus (USB), which allows for the easy attachment of external devices to a computer. Furthermore, as laptop and notebook computers become more powerful, they are offering a portable alternative to the desktop computer. Bills et al. also suggest that mobile devices such as personal digital assistants (PDAs), “smart phones,” and tablet PCs, which have all become common in the business world and some professions, may also hold possibilities for education. For example, scholars could use them to access and store information while in the library, in class, or meeting with students. Weitz, Wachsmuth, and Mirliss (2006) found that while only a fraction of faculty members are motivated to use tablet computers, those who are inclined to do so demonstrate that they have a meaningful impact on teaching and learning.

Indicators of Future Growth of Online Courses

Several sources have documented the growth in the number of online courses that exist and predicted that this growth will continue (Government of Canada, 2001; LaGrange & Foulkes, 2004; National Postsecondary Education Cooperative, 2004). The National Center for Educational Statistics, a branch of the U.S. Department of Education, has studied trends in distance education at post-secondary education institutions. Distance education is becoming more commonplace and the availability of networked technology has played a role in this increase (Lewis, Levin, & Greene, 1999; Tabs, 2003; U.S. Department of Education, 2004). Lewis et al. found institutions were planning to adopt or increase their use of Internet-based technologies in the future. They concluded that distance education, and in particular asynchronous Internet-based technologies, would become more common.

In Canada, the Advisory Committee for Online Learning reported that between March 1999 and May 2000, 57% of Canada’s 134 colleges and universities offered online courses (Government of Canada, 2001). All together, institutions offered a total of almost 3,000 courses, ranging from one online course to 340 online courses for each institution.

The report concludes that Canada is “among the world leaders in online learning” (p. 30). Memorial University of Newfoundland, where research for this study was conducted, is the largest dual-mode university in Canada—that is, a university that offers both online and in-class courses—both in terms of the number of courses offered online and the number of students enrolled in these courses (Government of Newfoundland and Labrador, 2005). Since data collection for this study was completed, the number of online courses offered and the number of students enrolled in them at Memorial University of Newfoundland continues to increase. The growth is mainly coming from out-of-province students, especially those in Ontario, Alberta, Nunavut and Northwest Territories (Belbin, 2004).

Evidence further suggests that the growth of online courses in Canada will continue. More technology is being integrated into teaching at both elementary and secondary schools (Ertl & Plante, 2004). Also, some authors have speculated that present and emerging trends in older adult education may lead to an increase in demand for online courses in the future (Thompson & Foth, 2003). An increased use of information and communication technology by all age groups in society will likely also increase demand for new options in terms of education programs and services.

Strong evidence is available that government policy and funding initiatives will encourage the development and use of innovative technology in learning. In 2002, the federal government launched “Canada’s Innovation Strategy,” which aims to improve our nation’s economic competitiveness by making Canada one of the world’s most innovative countries. That same year, two companion documents were also released by government: *Achieving Excellence: Investing in People, Knowledge, and Opportunity* and *Knowledge Matters: Skills and Learning for Canadians*. These documents outline goals, milestones, and targets to improve innovation, skills, and learning in Canada. The potential for increased use of technology in education is noted therein:

Innovations in education such as e-learning have the potential to dramatically expand the accessibility of post-secondary education. With the development and diffusion of effective e-learning practices across Canada and throughout the world, more learners at all stages of life will be able to access more educational opportunities. E-learning can play a role in helping institutions manage growing enrolment pressures and augment traditional teaching methods. (*Knowledge Matters: Skills and Learning for Canadians*, p. 31)

This recognition of the importance of e-learning was also acknowledged at the National Summit on Innovation and Learning sponsored by the Government of Canada in November 2002 and the National Dialogue on Post-Secondary Education in November 2005.

Purpose

The use of online courses is a relatively new and developing practice in education that is not yet completely understood. The purpose of this study was to further our understanding in this area by examining the process of adoption of asynchronous online courses by university professors located at Memorial University of Newfoundland. Through examining the situation and dynamics at this university, insight was gained that expands our understanding of the nature of this new technology and university professors' adoption of it. Enhanced theoretical understandings and practical suggestions, as well as the identification of areas requiring further research, emerged from these insights.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study is to further our understanding of the process of adoption of asynchronous online courses by university professors located at Memorial University of Newfoundland. In this chapter, an examination of the literature relating to technological change and, in particular, the adoption of online courses by university professors is presented. The research questions and conceptual framework for this study emerged from this review and are described at the end of the chapter. This review first of all will examine the literature that presents a broad perspective of technical change. Then, literature related to factors underlying the adoption by faculty of online university courses will be looked at. The review of the literature is organized into three interconnected levels of analysis: societal, institutional, and individual. This approach allows for the consideration of various theoretical perspectives—for example, theories relating to the social construction of technology proposed by authors such as Bijker (1995), as well as those that focus on innovation, such as Rogers' (2003) diffusion of innovation theory. A similar multiperspective theoretical approach is also supported by the work of Misa (1994) who pointed out the danger of analyzing just the micro or macro factors when examining technological change.

Perspectives on Technical Change

Before examining the adoption of asynchronous online courses within the context of universities it is useful to take a broad look at technological change. Understanding how technical change occurs may provide insights into the factors that affect the adoption of asynchronous online courses by university professors. The literature in this section is

organized into three levels of analysis: societal, institutional, and individual. In each level, theoretical and empirical literature will be presented, thus setting the stage for a more in-depth examination of the adoption of asynchronous online courses at universities. In some cases, theories cut across these levels of analysis. This is an early indication of the interactive rather than insular nature of these three levels of analysis—a point that was taken into account in the conceptual framework for this study.

Societal Dimensions of Technological Change

This section looks at the factors that influence the adoption of technological innovations, from the broadest perspective. First, it addresses the philosophical, and in many ways political, question of what constitutes progress. The social constructivist theories of several influential academics who have written in this area are examined, along with case studies that demonstrate how societal forces have shaped specific technologies throughout history. A theme that has emerged from these case studies relates to the political nature of decisions about the adoption of technology. Indeed, many authors (e.g., Bijker, 1995; Winner, 1985) have called for a more informed public debate and greater public participation in determining the use of technology.

Much has been written about the idea of progress as it has developed in Western society (Baillie, 1950; Bury, 1932; Nisbet, 2004). A theme documented in the academic literature involves mankind's advancement throughout history and the expectation that mankind will continue to advance. This notion of progress is often linked to a belief in technological determinism—that is, the belief that technology is an independent factor that initiates social change (Mackenzie & Wajcman, 1985; Murphine & Potts, 2003). In recent years, many scholarly writers have begun to question commonly held beliefs about

the nature of progress and to challenge the foundations of the idea of technological determinism. In the 1960s and 1970s, several authors highlighted some of the negative consequences of technological change and challenged the very way we, as a society, think about progress (Gabor, 1964; Hirsch, 1976; Mishan, 1967; Schumacher, 1973; Sorel, 1969).

The increased questioning of what progress means can be linked to the growing acceptance of constructivism—the philosophical belief that knowledge is constructed rather than determined by any reality that exists independent of these perceptions. Many scholarly writers have noted the extensive history of constructivist thought and its variations (Boudourides, 2003; Brey, 1997). In the field of education, constructivism has been a very practical theory used to guide knowledge construction by students. It has also led to an examination of how various disciplines are socially constructed and has raised questions about how they might otherwise be organized (Boudourides). The theories of Piaget (1952, 1972), which relate to the development of knowledge, and those of Vygotsky (1978, 1986), concerning zones of proximal development, have been particularly influential in the field of educational theory and practice.

As a result of the growing influence of the social constructivist theories in the 1960s, new ways of looking at academic fields started to evolve in the following decades. One example of this evolution is the growth of the social study of science and technology (Bijker, 1995). A branch that emerged from this area of study was the Sociology of Scientific Knowledge (SSK), which was advocated by scholars such as Kuhn (1962), Bloor (1976), and Feyerabend (1978). In the SSK, all knowledge is treated as being socially constructed. Thus, more attention is given to various forms of knowledge and

how power structures in society can influence how we construct knowledge. Pinch and Bijker (1989) suggested that the study of technology could benefit from taking the same approach and seeing technologies as social constructs.

In the 1980s and 1990s several authors started to articulate new theories of technological change. These theories proposed that technology is not an independent force that imposes change on society; rather, the technology itself is shaped by social factors (Bijker, 1995; Bijker, Hughes, & Pinch, 1989; Mackenzie & Wajcman, 1985). These theorists took a constructivist approach to the study of technology and supported their theories through the accumulation and analysis of case studies. The emerging theories included Bijker's (1995) Social Construction of Technology (SCOT) theory, the Actor-Network Theory (ANT) proposed by Callon (1989), Law (1989), and Latour (1992), and Hughes' (1989, 1994, 2005) Technological Systems theory. While focusing on different aspects of change, these new constructivist theories gave more weight to the role of societal factors in the development of innovation and were in sharp contrast to those theories that emphasized the innovation itself and the reactions to its introduction, such as Rogers' (2003) theory of diffusion and other theories of change.

Bijker (1995) devised the SCOTs theory by examining the development of three different technologies from various industries and periods in history. He looked at the role of social factors in the evolution of the bicycle, Bakelite (one of the earliest synthetic materials), and fluorescent lighting. Taken together, these three cases introduce the concepts of relevant social groups, interpretative flexibility, technological frames, and the use of power—all of which are important in understanding technical change as a social process. Relevant social groups influence the development of a technology and determine

how it is interpreted and whether it stabilizes. Humans look at innovations through technological frames comprised of knowledge, goals, and values and use power to shape both society and technology. If we want to shape technology in a certain way, it is important to first understand that technologies are malleable and, second, to understand their configurations so political action can be directed at changes needed. These three cases from different historical periods demonstrate some of the social factors that can influence the development and use of a new technology.

The Actor-Network Theory (ANT), developed primarily by Callon (1989), Law (1989), and Latour (1992, 2005), outlines how a network of both human and nonhuman “actors” is constituted and how this impacts technological change. The theory’s underlying assumption is that, as individual actors use technology, they do so in the context of a network that links their action to the influences of various other actors. The actors interact with each other in the network and promote their own interests and perspectives. The Actor-Network Theory assumes that relationships can change between actors and that some networks are more stable than others (Law, 2003). Networks grow more stable as actors, through interactive social processes, become aligned to a certain technology. In some environments, such as business organizations, alignments may occur through the exertion of various forms of power. In fact, sometimes procedures become so firmly established that they are rarely questioned. Research methods used by ANT-oriented researchers include investigating actor’s ideas and behaviours through interviews or ethnographic research, which sometimes involves the examination of historical sources.

Callon (1989) and Law (1989) used two different cases to illustrate the Actor-Network Theory. Callon examined the attempt in the 1970s to introduce an electric car in France. This case study demonstrates that it is impossible to distinguish what is technical and what is social during innovation processes. The technical, scientific, social, economic, and political considerations are “inextricably bound up into an organic whole” (p. 84). Some of the actors were nonhuman, while others, such as consumers, engineers, companies and regulators, each expressed their views through the relations within the actor-network. As with Callon, Law demonstrated that nonhuman forces can also be actors in a network. As Law examined early European exploration of the ocean, he discovered that ocean currents and winds could be viewed as actors in the network. It was not only technological and scientific discoveries that overcame the previous physical barriers of ocean currents and winds but also the actor networks that generated these technologies and made their use possible.

The Technological Systems Theory of Change has been articulated primarily through the work of Thomas Hughes (1989, 2005). Hughes has written much about the development of technological systems and how these systems influence the construction, acceptance, and use of technological devices. He is credited with having introduced systems theory into the study of the history of technology and has identified a number of patterns, such as the momentum of technology, which may be relevant to this research. For example, using the development of the electrical distribution system, he made a number of observations that are useful when examining the development and introduction of other innovations (Hughes, 1989). As with the proponents of ANT, Hughes recognizes that a technological system can be made up of both physical and nonphysical

components. In his case studies of electrical systems, he highlights physical components such as generators, transformers, and transmission lines, as well as nonphysical components such as manufacturing firms, utility companies, investors, a scientific community, and government regulation. Both these physical and nonphysical factors interact to find ways to make the technological system work. While a system can in many ways be self containing, forces from outside can have an impact on the system. For example, in the case of the electrical systems that Hughes studied, changes in oil price, supply stability, and environmental concerns can impact the system that produces and delivers electricity.

Hughes' (1989) observations can be valuable for those who want to direct the development of systems in certain ways. He divides evolving systems into five phases: invention, development, innovation, transfer and growth, and competition and consolidation. It is during the early phases of the system, he observes, that humans have the most autonomy and so change is easier to promote in these phases. Once systems become established, they are difficult to change because of what Hughes calls "systems momentum." As procedures are established within a system and humans have an established interest in perpetuating the system, change becomes more difficult. Also, once investments have been made in physical structures or production facilities it is more difficult to adopt new ways of doing things. There is, as Hughes points out, tremendous pressure within the system to make "continuous" type improvements rather than "radical" or "discontinuous" changes.

As mentioned earlier, these social constructivist theories are supported through the accumulation and analysis of case studies. Several case studies have shown how

societal factors influence the adoption of technology. Tenner (2003) demonstrated the interplay between social characteristics and technology through the examination of the introduction of many innovations. He documented how different user practices arise when a technology is introduced into different cultural settings. In doing this, Tenner illustrates how whole societies can change their previous practice without fully understanding the implications of the new technology they are adopting. Van Oost (2005) studied the impact of gender on the design and marketing of electric shavers. She noted that while the design and marketing of women's shavers was more "cosmetic influenced," and hid the technology involved, that of men's shavers emphasized the technical aspects of the device. In documenting the development of shaving devices, Van Oost demonstrates not only how social factors shape the development, design, and marketing of products but also how this process is political in that it reinforces societal views such as gender stereotypes.

In her study of the history of home heating and cooking systems in the United States, Cowan (1989) showed how economic factors interact with other social factors to influence the development of technology. She used the concept of the "consumption junction" as a way of understanding who the consumers were and how they made choices when faced with competing technologies. By examining who made the decision to use a specific technology, she identified elements that were important in the adoption process. Different social configurations of who the "consumer" was influenced the type of technology that was preferred. Furthermore, Cowan noted that social factors and cultural practices were important in decision making. An example she used was that some social groups preferred to cook over an open flame while others thought this to be "primitive."

Cowan (1989) also found that technologies cannot be examined in isolation.

Advances in transportation and metal work, for example, drastically changed how home heating and cooking systems evolved. Schot and Bruheze (2005) expanded on aspects of Cowan's (1989) "consumption junction" and proposed the concept of a "mediation process" between production and consumption. In this process, designers attempt to take into account the demands of projected users, real users, and represented users. Schot and Bruheze found that identifying the preferences of "users" is, in many cases, a difficult process of mediating many different interests and perceptions.

Two very different examples, from the field of medicine, further illustrate the social construction of technology. Epstein (2005) referred to biomedical research and new drug development to show how some social groups or potential users are excluded from the process of development. For example, women, children, and racial and ethnic minorities have tended to be left out of many drug trials; consequently, their needs have been neglected as new drugs are developed and used. While the practice of field testing is not as entrenched in other areas of research as it is in medical research, this example nevertheless clearly demonstrates how some categories of potential users can be excluded from the societal shaping of technology. In contrast to Epstein, Rose and Blume (2005) use the example of vaccines to point out the difference between collective state-imposed technologies and those that are introduced into a market-driven economy. This case demonstrates how the use of a technology can be based on the political values of a society. The development and use of technologies can be influenced in many ways by government involvement. While technological adoption is not always as extreme as forcing people to adopt it—as in the case of vaccines—governments have the resources

to conduct public information campaigns that encourage the use of technologies, as well as the resources to subsidize their development and adoption.

Winner (1985) explored the notion that technical machines, structures, and systems have political qualities and embody power and authority. He presented cases wherein the way a technology evolved was based on a political decision and cases where the technology supported particular political frameworks. For example, when governments invest in the construction of roads for automobiles rather than in the development of mass public transportation, they are favouring one form of technology over another. In addition, Winner submitted evidence that buildings, university campuses, and city streets have, in many instances, been designed to prevent political protests or promote certain political goals. He emphasizes that choices made early on in the development of technologies often set a course that can endure for generations. While some technologies are “flexible” and can be changed quite easily, he notes, others are “inflexible” and establish a particular form of political interaction. Also, to accept a certain technology brings with it a certain power structure in society. Winner points out that people accept major changes in their lives based on technological change that they would resist in a political realm. Because of this, he advocates connecting the technical and political process.

This overview of the literature illustrates how societal factors have impacted the adoption and use of technologies. It further highlights how concepts of progress have been challenged and demonstrates the political nature of the development and adoption of technology. Components of the theories presented here provide useful analytical tools for examining the social factors involved in the adoption and use of asynchronous online

courses. For example, the concepts of relevant social groups, economic models, political factors, physical environmental factors, and technological momentum all warrant exploration in the context of this study. Many theories have been put forward to explain how societal factors impact the adoption and use of technologies; similarly, theories have been proposed to explain the institutional dimensions of technological change. These theories will be examined in the next section.

Institutional Dimensions of Technological Change

In this section the institutional dimensions of technological change are explored. It examines several theories that attempt to explain change and how it occurs in educational environments. Some of these theories focus exclusively on educational settings while others have been developed in different contexts and then applied to educational settings. First, various theories of change will be explored; then a more rigorous examination of Rogers (2003) theory of diffusion will be undertaken in relation to factors at the institutional level, which effect the rate of adoption.

Institutions are established organizations or corporations within the broader society that have a specific purpose and function. While institutions exist within the context of a broader society and are creations of that society, they are also composed of individuals. Various kinds of institutions have established patterns of behaviour for the individuals linked to them. For example, some established patterns of behaviour in financial institutions, such as banks, may be quite similar to those in educational institutions, while others might be quite different. Understanding the nature of institutions will provide insight into the adoption and use of new technologies and techniques by these institutions. By first taking a broad look at the institutional dimensions of

technological change, a foundation will be established to view more thoroughly the adoption of asynchronous online courses by universities and professors.

Donald P. Ely has written extensively about educational change and the environmental conditions necessary for change to occur. The conditions for such change, as identified by Ely (1990) are: (1) dissatisfaction with the status quo; (2) existence of knowledge and skills; (3) availability of resources; (4) availability of time; (5) existence of rewards or incentives; (6) participation; (7) commitment; and (8) leadership. Michael Fullan, another prominent scholar in the field of educational change, and Suzanne Stiegelbauer (1991) also identified agents of change—six local agents and two from outside the localized community: (1) the teacher who is in a position to control what happens in the classroom; (2) the principal who sets the climate for change in the school; (3) the students who are impacted by educational change; (4) the district administrator in charge of establishing district policy; (5) the consultant who brings specialized knowledge; (6) the parents and the community in general; (7) the government, which sets overall policy directions; and (8) the teacher educators who provide teachers with the tools to lead change. Fullan and Stiegelbauer also outlined practical guidelines for each of these change agents to implement change.

While Fullan and Stiegelbauer (1991) provided practical guidelines for various categories of change agent, Havelock and Zlotolow (1995) focused on the change process. They presented a seven stage planned change process they refer to as the CREATER model. The stages of this cyclical model are: (1) Care: There's something wrong here, or something could be more right; (2) Relate: Who and what make up this system? How are they interconnected? (3) Examine: What is the true nature of the

problems and opportunities at hand? (4) Acquire: What information or other resources are available? How do I get them? (5) Try: What solutions will really work here, and how might I need to adapt them? (6) Extend: How do I solidify adoption or diffuse the change to other populations? and (7) Renew: How do I develop a capacity for self-renewal in the client system?. Each stage in this cycle is viewed as part of the holistic process. Havelock and Zlotolow also explored how change agents can be effective at each stage.

Zaltman and Duncan (1977) examined resistance and barriers to change. They categorized four types of barriers: cultural, social, organizational, and psychological. Cultural barriers include values and beliefs, cultural ethnocentrism, saving face, and incompatibility of a cultural trait with change. Social barriers include factors such as group solidarity, rejection of outsiders, conformity, conflict, and group introspection. Organizational barriers include threat to power and influence, organizational structures, behaviour of top-level administrators, climate for change in the organization, and technical barriers for resistance. Lastly, psychological barriers include perception, homeostasis, conformity and commitment, and personality factors. Others (e.g., Gjerde, 1983; Pool, 1995; Schieman & Fiordo, 1990; Theron & van der Westhuizen, 1996; Waldrop & Adams, 1988) have expanded on Zaltman and Duncan's classic work and emphasize the importance of understanding resistance in order to promote change.

Each of the three models of change presented above offers valuable observations about how change occurs in educational environments. These alternative models focus on the various aspects of change and in many ways complement Rogers' (2003) theory of diffusion of innovations (see Figure 1). Rogers' theory of diffusion consists of five

variables that explain the rate of adoption of an innovation: (1) perceived attributes of innovations; (2) type of innovation decision; (3) communication channels; (4) the nature of the social system; and (5) the extent of change agents' promotion efforts. Within this framework, Rogers offers insight based on research evidence into the dynamics operating within each of these variables.

As one of the most widely used theories concerning change, Rogers' (2003) theory provides many concepts that are useful in this study of the adoption of asynchronous online courses. It is a comprehensive theory drawing on research conducted over a wide variety of fields, it has been adopted by many other researchers doing research related to the adoption of innovations, and it includes components focused on in the other models. Moreover, Rogers' theory of diffusion of innovations provides insights and identifies general rules as to how individuals and organizations adopt innovations. Three variables in Rogers' theory are of particular importance at the institutional level of analysis: the communication channels, the nature of the social system, and the extent of change agent's promotion efforts.

Rogers' (2003) diffusion theory resulted from a comprehensive examination of the change process in numerous settings. The theory has since been applied as a framework to many different situations—for example, to study the adoption of public health practices such as boiling water, the use of vitamins, and the use of birth control methods. In agriculture, the framework has been used to examine the adoption of the use of new seeds, alternative crops, pesticides, machinery, and other innovations. In the field of sociology and anthropology, it has been used to look at the introduction of innovations into cultures, such as the snowmobile into northern cultures, and the introduction of

various tools from one culture to another. In business, the theory has been employed to explain management practices, organizational behaviour, and the marketing of new products.

Rogers (2003) identified communication channels—that is, “the means by which messages get from one individual to another” (p. 18)—as being important to the diffusion of new ideas. Both mass media and interpersonal channels have characteristics that make them important to the process of adoption. While the mass media play a role in creating awareness, interpersonal networks are more important in influencing the decision to adopt an innovation. Rogers (2003) recognized that diffusion is a social process and that communication flows more freely and is more effective when the individuals involved share similarities. While people within a group are usually able to talk freely with each other, communication outside the group is also needed in order to bring in new ideas. The openness of institutions and the structures they put in place to facilitate the internal and external communications are important determinants of their innovativeness.

Others have expanded on Rogers’ (1995, 2003) work, focusing on the special challenges presented by disruptive or discontinuous innovations. Moore (1995) examined the technological adoption life cycle from a business perspective and identified strategies that can be used to guide adoption. He argues that truly disruptive or discontinuous innovations—that is, those requiring a dramatic change from past behaviour but which result in dramatic new benefits—require special adoption strategies. Both Moore and Rogers recognized the importance of communication channels and the role of the “innovators” and “early adopters” in the change process (see Figure 2). In many cases, the recommendations of a respected peer can substitute for trials, thus speeding up the

adoption process. Moore (1999) identified the “chasm” that exists between the early adopters and the early majority and highlighted the difficulty of getting a product across this barrier into mainstream usage.

Early research into communication networks, such as that of Granovetter (1973), is also significant in the study of technological adoption. Granovetter demonstrated that “weak ties” among individuals can have strong effects on the diffusion of new ideas. The more recent work of Constant, Sproull, and Kiesler (1996) examined how people use e-mail to seek technical advice from “strangers” or those with whom they had “weak ties.” The fact that individuals provided useful advice and information when they were contacted, despite not knowing the person making the request, provides insight into how these relatively new communication channels might impact on the diffusion of innovations.

Another variable that helps determine the rate of adoption is the nature of the social system. Rogers (2003) defines a social system as “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal” (p. 23). According to Rogers, such things as established patterns of behaviour and organizational structures determine the innovativeness of social systems. Other researchers have also looked at various aspects of institutions as social systems that influence innovation adoption. The size of the company or organization and its culture can greatly impact how quickly it adopts new technology. Christensen (1997) examined how “great firms” often fail when confronted with disruptive technology. He found that established companies can become too focused on their traditional customers and overlook new possibilities which might exist because of disruptive innovations that create new customer groups. Christensen and

Overdorf (2000) investigated how companies respond to different kinds of change to take advantage of opportunities that arise. They found that it is more difficult for large established companies to enter new emerging markets than it is for new, smaller companies and advocate that large companies develop strategies, such as establishing independent smaller subsidiaries, for pursuing new emerging opportunities.

Rogers (2003) noted how the rate of adoption of an innovation can be influenced by the extent of change agents' promotion. According to Rogers, a change agent is an individual who influences people's innovation decision, "usually . . . to secure the adoption of new ideas" (p. 366). The change agent serves as a link between those advocating change and the group they intend to change. Fullan and Stiegebauer (1991) also emphasized the importance of change agents in innovation. While other researchers do not specifically mention change agents they talk about supports for change within organizations. For example, Ely (1990) discussed the availability of resources and leadership needed for change, while Zaltman and Duncan (1977) emphasized the need for a climate for change within organizations.

Cases studies of the introduction of other innovations have highlighted the importance of communication channels. Pinch (2005) documented the introduction of electronic synthesizers into the music industry where a group of "users" was developed through marketing efforts. Pinch highlights the value of using marketers and salespeople as mediators between the users and those who design and produce the product. In recounting the tactics used by a pioneer salesperson of synthesizers, he demonstrates the importance of identifying and recruiting potential early adopters to act as role models. Also, the experience of this salesperson indicates the kind of intense and persistent effort

required to establish a new product and create demand for it. By using such strategies as attracting high profile rock stars to showcase the innovation and by providing demonstrations and training on the innovation, a large demand was created for this new technology. These early salespeople served as communication channels and change agents as they often identified problems with the innovation and devised strategies to overcome them. Pinch documented the difficulty of introducing a new product and demonstrated that alternative outcomes are possible. Persistence and hard-sell techniques of supporters are often needed for a new innovation to come into widespread use.

Evidence from one of the earliest studies on the use of technology in education, the Apple Classrooms of Tomorrow (ACOT) project, also demonstrates the importance of communication channels and change agents. Humans are more likely to adopt an innovation if they can discuss it with those who use it in situations similar to their own (David, 1996; Yocam, 1996). Factors such as geographic isolation or lack of interaction with others have been shown to have a negative impact on innovativeness (Rogers, 2003). Communication networks can be developed by institutions through providing support for conferences, social events, contact through work arrangements, or any other situation that encourages peer contact and the sharing of information.

In conclusion, institutions are organizations that have a specific purpose and function within the broader society. Although they are composed of individuals, their scope and continuity do not depend on any single individual. As with individuals, institutions have a nature and characteristics that influence how they react to change. The

overview of the institutional factors of innovation presented here provides insight into the factors that might impact the innovation of asynchronous online courses at universities.

The Dimension of Individual Agency Underlying Technological Change

This section examines literature related to how individuals make decisions to adopt and use new technology. As noted by Gardner (2004), individuals change their minds in different ways based on the nature of the decision they are making. Rogers (2003) also emphasized this point, distinguishing between “continuous” change and “discontinuous” change. Continuous change requires very little change within the organization or by the individual, while discontinuous or disruptive change requires major changes but results in significant improvements.

The interdependence of social and individual agency has been the subject of much academic debate throughout history. The central issue is whether individuals are the subject of change occurring in society or whether they can be active participants in making change happen. Many have concluded that there is an interaction between individual and social agency that results in a duality of individualizing the social and socializing the individual. It has been noted that various kinds of authority or the use of financial reward can be used in the workplace to influence the use of a new technology (Billett, 2006; Dillion & Morris, 1996). One of the variables in Rogers’ (2003) theory of diffusion of innovations (see Figure 1) is the type of innovation decision. Rogers recognized that the degree of independence an individual has in making a decision can be determined by the context in which the person makes the decision. He categorized innovation decisions into three types: (1) “optional decisions,” which are made by individuals, independent of others in the organization; (2) “collective decisions,” which

are the result of a consensus of people in the organization; and (3) “authoritative decisions,” where the decision is made by a few people and imposed on the rest of the people in the organization. Also linked to these three types of decisions is the “contingent decision.” In this case, an individual only makes the decision to adopt when the organization he or she is in has made a prior decision about adoption.

Albert Bandura has devoted much of his life’s work to furthering the understanding of the psychological processes that allow individuals to see themselves as being in control of their own future. Bandura’s (1986) concept of self-efficacy has been used as a foundation to develop the concept of “computer self-efficacy” (Compeau & Higgins, 1995). In order to measure computer self-efficacy, Compeau and Higgins developed a questionnaire that was general enough to apply to any computer system. Other researchers have taken the idea of measuring self-efficacy in relation to computer skills and developed measures for more specific software packages (Agarwal et al., 2000; Venkatesh & Davis, 1996).

Several theories and models have been proposed to explain individual adoption of technology. The Technology Acceptance Model (TAM) was developed by Fred Davis and colleagues (1989) to provide an understanding of the factors that influence an individual’s decision to use new software. Two aspects of this model—the perceived ease of use and the perceived usefulness—are similar to the “perceived attribute of an innovation” variable in Rogers’ (2003) theory of diffusion. During the adoption stage, individuals are looking for information about what the innovation is and how it works, as well as “evaluating” information that looks at the advantages and consequences of the innovation. Rogers (2003) identified five characteristics of innovations: (1) relative

advantage; (2) compatibility; (3) complexity; (4) trailability; and (5) observability.

Another commonly used model to understand individuals' decisions to use technology is the Task-Technology Fit Model developed by Goodhue (1995). As the name of the model suggests, potential users make a decision about the technology based on how well it fits the characteristics of the task.

The Concerns Based Adoption Model (CBAM) developed by Eugene Hall and colleagues originated in the 1960s with the work of France Fuller, which investigated the general concerns of new teachers as they embark upon class teaching (Fuller, 1969). Her research identifies the kind of concerns teachers had at various stages of entering the profession. Based on this research, others recognized that similar concerns were evident in adopters of various educational innovations. While some research had been done prior to Fuller's, on beginning teachers' anxieties, and surveys had been developed to measure the levels of such anxiety, Fuller built on the existing research and proposed that teachers' concerns happened in a sequence of three phases: a pre-teaching phase, an early teaching phase, and a late teaching phase (Hall, George, & Rutherford, 1998). Fuller's early research into the concerns of teachers led to further developments that eventually resulted in the CBAM. In the early 1970s, the original CBAM paper outlined how Stages of Concern (SoC) and Level of Use (LoU) could be used as diagnostic tools to plan interventions that would facilitate change (Hall et al., 1973). Since then, the CBAM has evolved into a more complete model and has been used in many educational contexts. Currently, the model includes 12 principles of change and three diagnostic tools: (1) the innovation configuration; (2) the Stages of Concern; and (3) the Level of Use (Hall & Hord, 2005). The CBAM is typically employed to examine change in education and

includes some of the most widely accepted quantitative measurement tools used to guide educational change efforts.

Another influential aspect of Rogers' (1995, 2003) work, in addition to the identification of the variables that determine the rate of adoption, is the categorization of individuals according to their propensity to adopt innovations (see Figure 2). The "innovators," as Rogers defines them, are the most venturesome group and perform an important role by initiating new ideas and approaches within a social system. The "early adopters" are respected, and often opinion leaders within their social system and are more judicious in their innovation decisions compared to the "innovators," who are sometimes seen as too rash and daring. The "early majority" is a large and critical group in the adoption of innovations that deliberates for a longer time before deciding to adopt. The "late majority," another large group, are more skeptical and cautious about innovations. Finally, the "laggards" are the last to adopt an innovation and usually look to tradition and past practice to guide their activities rather than being influenced by what others are doing.

The innovators and the early adopters play a critical role in the change process. In many cases, the recommendations of a respected peer can substitute for trials, thus speeding up the adoption process. Moore (1999) identified the "chasm" that exists between the early adopters and the early majority and the difficulty of getting a product across this barrier into mainstream usage. Because of the difference between these two adoption categories, it is difficult for some new products or practices to make the transition into mainstream use. Bandura (2006) also acknowledged the importance of innovators and early adopters in the further adoption of new ideas. His social cognitive

theory recognizes the importance of “role models” for creating self-efficacy in other individuals.

Several case studies illustrate the importance of individual agency in the adoption and use of new technology. Lindsay (2005) examined the introduction and use of one of the first home computers, the TRS-80, introduced by Radio Shack in 1977. When this computer was introduced it was on the leading edge of creating a new market for home computers. Designers and marketers tried to understand who would use this new technology and were strongly influenced in their approach by their experiences with electronic hobby kits that the company had successfully marketed in the past. As the product evolved, the company started to configure other possible “users,” and the product, as well as its marketing, changed based on the evolving understandings of who the users were. While intending to focus on the introduction of this computer up until its eventual discontinuation in 1984 Lindsay found that, 25 years after the original marketing company had abandoned TRS-80, some people were still using it and had developed their own user support group. This case is important to the study of the adoption of technology because it demonstrates that users can configure and use new technology in ways unintended and not envisioned by the original designer and promoters of that technology.

In Hughes’ (1989) examination of the development of technological systems, he observed that both the physical and nonphysical components in a system interact in the “messy, complex, problem-solving components.” Kline (2005) further explored this issue by looking at the introduction of the telephone and electricity in rural America from 1900 to 1960. He showed how the resistance of users can influence technological change and also the kind of social transformations that occur with new technology. He introduced the

phrase “transformative resistance” to express how resistance can lead to a negotiation among producers, mediators, and users that eventually creates technological and social change. The case of rural electrification emphasizes the role government can play in the promotion of innovations. Through one of the New Deal programs called Rural Electrification Administration (REA) the American government organized cooperatives and provided them with low interest loans to facilitate the development of power systems for rural areas. These cases also show how resistance and interaction between promoters and resisters can lead to new technologies and social relations. It is evident that the cultural values of independence and self-reliance that existed in rural America influenced the development of these technologies.

Wyatt (2005) showed how even non-users of a technology are often impacted by the very presence of the technology in society. She illustrates how the lives of people who do not drive are impacted by the automobile. Just as automobiles have shaped how society is organized, they have also affected people’s lives—such as pedestrians having their health and well-being threatened by vehicles in various ways. Wyatt also explored non-users of the Internet and why they are important. She noted that there are different categories of non-users: (1) “resisters,” or those who have never used; (2) “rejecters,” or those who have tried using the Internet and then stopped for some reason; (3) the “excluded,” or those who have never had an opportunity to become users; and (4) the “expelled,” those who involuntarily had to stop using. She maintains that based on this understanding of non-users, policy implications can be examined and appropriate actions can be devised. Laegran (2005) also made comparisons between the Internet and automobiles. She examined the use and non-use of the Internet and automobiles as

“escape vehicles” in youth culture in a rural Norwegian community. One group became very involved in car culture and used them as a way of traveling to other places while the other group of youth shunned such an approach and preferred to use the Internet to make contact with the outside world. The way these two very different youth groups developed based on their preferences to use either the Internet or cars as their main way of connecting with the outside world illustrates that social factors do have an impact on an individual’s use of technology.

In this section, the literature related to factors that influence how individuals make decisions regarding the use of technology was examined. The interconnected nature of the three levels of analysis—societal, institutional, and individual—and how societal and institutional factors influence individual decisions was emphasized. The work of Bandura (1986, 2006) and other researchers in the area of self-efficacy reveal that this is an important individual factor regarding the adoption of technology. In addition, individuals’ concerns about innovations and their impact on adoption, as well as categories of individuals based on their innovativeness, were highlighted. The decision-making processes for individuals in these various categories are quite different and require different encouragements and supports. The theoretical literature and case studies presented show that while there are some identifiable patterns that can be used to explain individual decisions to adopt a particular technology, it is often difficult to understand the individual decision-making process without detailed information related to each innovation.

Summary

In this section, literature related to technological change on a broad level was examined. The literature was presented in three interconnected levels of analysis: societal, institutional, and individual. In the literature related to societal factors, theories and case studies were presented that demonstrate how societal factors have had a significant impact on the development and adoption of many innovations throughout history. Further, it was revealed that nonhuman actors are important in the adoption of technology. In the literature related to the institutional level, theories of change that have been used in the field of education were presented. The importance of aspects of Rogers' (2003) theory of diffusion was also highlighted. The nature of the social system, the communication channels, and the role of change agents were identified as variables that are primarily influenced at the institutional level. Literature that pertains to individual agency and technological change highlighted the importance of the nature or significance of the change occurring and the factors that impact an individual's innovativeness and their predisposition to change. Overall, this broad examination of the literature concerning technological changes provides a basis for a more in-depth examination of the literature related specifically to the adoption of asynchronous online courses at the university level.

Factors Underlying the Adoption of Online University Courses

Pertinent literature relating to the context and subject matter of this study—the adoption of asynchronous online courses by university professors—will be examined in this section. Societal factors such as the physical environment, political factors, continued technological change, the evolving economic model, and the general acceptance of online

courses will be examined in the context of their impact on the development of online education. In some cases, such as with the continued technological developments, factors are examined within the broader society, but in others more localized societal factors, such as the political situation and population patterns in Newfoundland and Labrador, are important. In relation to institutional factors, literature related to the general characteristics of universities will be examined, along with case studies from other universities that document efforts to encourage the adoption and use of online courses. Lastly, the literature that relates to individual factors and the nature of change required by professors, as well as the various items that influence their decision to adopt, will be synthesized.

Societal Dynamics

Online courses are a relatively new way of offering educational opportunities. There are many indicators of future growth in the number of online courses offered at universities. As information and communication technologies become more pervasive in society, universities are planning to offer more courses in this manner (Government of Canada, 2001; LaGrange & Foulkes, 2004; National Postsecondary Education Cooperative, 2004). Evidence is also available that the federal and provincial governments are interested in promoting the use of technology in education and see online courses as one way of promoting economic growth through the creation of an innovative society (Government of Canada, 2002a; Government of Canada, 2002b; Government of Newfoundland and Labrador, 2005). In this section, the literature related to the societal dynamics that impact the adoption of asynchronous online courses at Memorial University of Newfoundland will be examined. Specifically, literature on the

evolving technology related to online courses, the political context, and the relevance of geographic facts of physical environment and population patterns will be reviewed.

Technological change plays an important role in the societal dynamic.

Advancements are being made in both hardware and software. High-speed connections, which facilitate multimedia and video, are becoming more common, as are wireless connections and smaller, more powerful devices (Hedin, 2006; Nicholson, 2002; Yin & Trinidad, 2005). Also, social software (e.g., blogging, audio conferencing, instant messaging, wikis, social bookmarking) is starting to be integrated into online teaching (Alexander, 2006; Bryant, 2006; O'Reilly, 2005; Tapscott & Williams, 2006; Weller, Pegler, & Mason, 2005). These new technologies are impacting the nature of online courses and the field of information and communication in general, indicating that online courses, in the terminology of Bijker (1995), have not yet stabilized. Moreover, innovations in the field of information and communication technology are much more prolific and continuous now than they were in the industrial era when the pace of change was much slower.

Several societal factors relate specifically to the province of Newfoundland and Labrador. Memorial University of Newfoundland (MUN) is the only university in the province. It has a long history of using various technologies over the years to offer distance education opportunities to a dispersed population faced with challenging geographic and climatic conditions. It has been proposed in the theoretical literature that physical and nonhuman actors interact with human actors (Callon, 1989; Hughes, 2005; Law, 1989). In the context of the introduction and use of online courses at MUN, there is specific evidence that this is indeed the case. Several authors have noted that political and

cultural dynamics have led to an expectation and political pressure, that governments provide educational opportunities and other government services to rural areas of the province (Inverson & Matthews, 1968; Major, 2002; Matthews, 1978; Morgan, 1997; O'Flaherty, 1999). Recent government documents, such as the provinces innovation strategy (Government of Newfoundland and Labrador, 2006a) and the white paper on post-secondary education (Government of Newfoundland and Labrador, 2005), recognize the importance of information and communication technology in providing educational opportunities to people in rural areas.

The significance of the economic model and public policy decisions involved in the use of information and communication technology in universities is emphasized in the literature. For example, the issue of commercialization and the potential of open source courseware present points for discussion and analysis regarding the possibility of social and political interventions shaping the nature of online education.

In the context of information and communications technology, the open source software movement is a key area that many see the technical, economic and political processes coming together. Werry (2001) outlined some of the challenges to traditional public education that have come from the corporate for-profit sector. These challenges arise not just from private institutions but also from the outsourcing of various services such as e-mail at learning institutions, as well as the increased number of partnerships between public universities and private sector companies. Rather than resist the use of technology in education, Werry advocated the concept of "critical engagement" and called for the development of an "open source movement" for academic resources, similar to that which developed in the software industry. Hepburn (2004) advocated the

establishment of “an educational commons” through the development of open source software text books and other educational material. A similar case has been made by others for the development of open source software in general (Browne, 1998; Jesiek, 2003; Perens, 2005; Raymond, 1999).

Von Hippel (2005) made the case that users of products and services are increasingly able to modify existing products or develop new ones to meet their individual needs. He refers to this process as the “democratization of innovation” and believes that this new model will replace the traditional industrial model where services and products are developed in a closed environment by the companies involved. Several evolving factors are bringing about this change. Computer tools, which were previously only available to a few specialized product designers, are now available to individual users at a lower cost. Also, many individual users enjoy the process of innovating and participate in Internet-based innovation communities that increase the effectiveness of user-based innovations. In using these techniques, individual users are often able to achieve results superior to those generated by large companies in the traditional product development process. Von Hippel also contends that users tend to develop more novel solutions, whereas larger companies are more likely to produce “enhancements” or “continuations” of products that they have already successfully introduced. While he believes the democratization of innovation is happening in varied fields and has many implications for the way companies do business, he sees it as being most evident in the software development sector.

Another political disagreement evident in the literature centres on the very use of online courses in education. Not everyone agrees that the increased use of online courses

is a positive development. In fact, many concerns have been raised about the possible negative impacts of the use of this new technology. Scholarly writers, such as Noble (2001), have provided critical examinations of what is happening with online courses in post-secondary education. Noble argues that the trend towards the use of technology robs faculty members of their knowledge and skills and will eventually lead to them losing control of their working lives. He contends that the conversion of courses to courseware means, “the knowledge and course design skill embodied in that material is taken out of their possession, transferred to the machinery and placed in the hands of the administration” (p. 32).

In this section, literature related to societal factors that specifically impact the adoption of online courses at the university level was examined. Government support for online courses is evident in various government reports. Further, literature reveals that the geographic factors and population patterns in Newfoundland and Labrador have contributed to the adoption of online courses. Also, the literature shows a trend toward continuing and fast paced developments in the technologies used for online courses. The fast pace of technological change is causing a re-examination of economic models. The open source movement in education is an example of how new economic models are evolving based on changes in technology.

Institutional Dynamics

Institutions exist within the context of a broader society and are creations of that society. The university is a special kind of institution and each has its own particular circumstances and characteristics. In this section, literature related to various aspects of the university will be examined in relation to the adoption of asynchronous online

courses. Universities are often seen as bureaucratic organizations that are slow to change in reaction to outside pressures (Bercuson, Bothwell, & Granatstein, 1997; Daniel, 1996; Laidler, 2002; Miller, Martineau, & Clark, 2000). For some, such as Taylor (2001) and Daniel (1996), this is an incongruous idea. Both note that while, in many cases, universities are resistant to change they are seen as sources of innovation for society. Some examples of universities attempting to meet the “emergence of the global higher education economy” have been documented by Taylor and Swannell (2001). In the case of the University of Southern Queensland, Australia, Taylor and Swannell note that for society to take advantage of the benefits of new technologies, institutional reconstruction, which requires considerable time and resources, is necessary.

Many scholarly writers have commented on how the challenges faced by universities are changing the social structure at universities (Daniel, 2000; Noam, 1995; Psycharis, 2005; Rajasingham, 2005; Singleton-Jackson & Newsom, 2006). Noam (1995) predicted a “dim future” for universities as new technologies alter the three primary functions of a university: the creation of knowledge, the preservation of information, and the transmission of this information to others (teaching). He envisioned a rise of commercial firms that will offer undergraduate and professional education more efficiently than the current university structure. According to Daniel (2000) two realities are setting the agenda for higher education in the “new economy” of the 21st century; lifelong learning and the use of educational technology. Lifelong learning, he claims, will be the norm and the huge increase in the number of students will place tremendous demands on current educational structures to change. The availability of new technology, and its integration into education, will be factors that help universities meet these new

demands for lifelong learning. He sees the rise of “mega-universities” as a possible response to the demands of the new economy. Rajasingham (2005) talked about “virtual universities” as a means of addressing some of the challenges Daniel (2000) outlined. Rajasingham, however, predicts these “virtual universities” will exist at the same time as and work with traditional universities, while also responding to globalization and the use of new educational technology.

Prensky (2001) made the point that the nature of the social system at universities is being altered by advancements in information and communication technology. He contends that “today’s students are no longer the people our educational system was designed to teach”. While current students are “digital natives” who have spent their lives using computer games, e-mail, cellphones, instant messaging, and other technology, the education system is organized by “digital immigrants” who, he claims, do not speak the same language or, if they do, speak it with a “strong accent”. Prensky argues that educators will have to change both teaching methods and content to make learning more meaningful to students. More recently, Prensky (2006) outlined some of the features that will be important for educators in the 21st century. He suggests that educators will have to shift gears and pay attention to how students learn, collaborate more with students in terms of what they teach and how they teach, provide more flexible organizations and integrate digital tools into teaching, as well as provide content that is relevant and up-to-date.

Miller et al. (2000) reviewed some of the barriers to technology infusion, while also examining promising and successful models of technology infusion. They classified barriers into two groups: organizational barriers and individual resistance. Organizational

barriers are caused by a lack of leadership and an institutional culture that impedes the infusion of technology. From the point of view of individual faculty members, barriers to integration included a fear of change, and the belief that face-to-face is the most effective medium in which to learn. Miller et al. cite examples of successful infusion of technology, such as the increased use of e-mail and the number of courses using Web sites. They also note that a number of institutions and individuals are leading the way with innovations that truly change the nature of education.

Another important part of the adoption of online courses is the institutional supports offered to those wanting to teach online and the work of change agents to encourage it. In the case of online courses, there is a difference in levels of understanding about how online courses can be used to offer university education. Technical chasms, or pedagogical chasms, are available that the change agent can span. A comparison of the early literature on this topic, to that which is more recent, indicates that change efforts are moving from faculty level coordinated programs to more comprehensive university-wide efforts. Several examples of how the presence of institutional supports and change agents promoted the use of information and communication technology will now be examined.

Two early studies recognized the importance of “hands on” and sustained efforts by change agents. At the University of Delaware, deVry and Hyde (1997) explained how Practical Resources for Educators Seeking Effective New Technologies (PRESENT) has resulted in more effective use of educational technology. The effort involves a hands-on evaluation site where professors can experiment with new technology in a simulated university classroom. However, it is not clear whether this strategy alone would be sufficient to encourage early adopters or the development of interest among other faculty.

In a second study, Gonzales et al. (1997) documented the implementation of a pilot program with masters' and doctoral students in the "learning technologies program". The students mentored faculty one-on-one to integrate technology into their courses at New Mexico State University. They concluded that the one-on-one interaction presents a viable solution to the problem of how to increase faculty knowledge about educational technology.

Other more recent studies have also recognized the importance of faculty development efforts. Fennema (2003) found that there is a continued need for faculty training in offering online courses. She proposed that such training involve a combination of face-to-face, online, and print resources, and that it should cover the development and teaching of the course. Fennema further found that professors who participated in this kind of training created better online courses and relied less on help desk support in future courses they developed. In terms of preparing online instructors, Yang and Cornelious (2005) recommend that faculty not be forced to teach online courses, that training be provided, that mentors be available in each department or college, that professors receive more training in technology and course design, and that student evaluation be used as a way of receiving suggestions for course improvement. Muirhead and Betz (2002) examined faculty training for online delivery at the University of Phoenix. They learned that, because of the varied needs of faculty members and their different levels of online experience, professional development should include both formal and informal opportunities to learn about the technology.

Several studies support the importance of an intensive and sustained effort by a change agent in technology integration (Truman, 2004; Varvel, Lindeman, & Stovall,

2003; Yang & Cornelious, 2005). One such example is mentioned in a study by Rups (1999). She examined the experiences of Western Michigan University faculty with a series of noon-hour seminars designed to encourage faculty to incorporate new technology into their teaching. The results from the seminars were not as great as expected. While faculty members gained some information and learned a bit about software, “progressing on to the next step of producing an instructional project rarely occurred” (p. 1). The next effort at Western Michigan, an intensive week-long event called the Enhancing Teaching with Technology Institute (ETTI), resulted in some professors establishing Web pages and integrating the use of technology into their teaching. The experiences of faculty members as recounted by Rups support Rogers’ (2003) contention that people need different kinds of support at different stages of the adoption process.

Thurston, Stuve, Pianfetti, and Thomas (1998) rendered an account of the experiences of the College of Education at the University of Illinois. A new Office of Educational Technology (OET) was established to support faculty use of information technology through co-teaching technology strands in courses, individualized one-to-one faculty consulting, workshops, and technical troubleshooting. The staff of the OET recognized the need for this “broad range of support to facilitate successful integration of technology” throughout the various academic programs in the college and the need “to provide continued support for technology development for faculty and staff” (p. 1). A more recent article by Varvel et al. (2003) documented the success of the Illinois Online Network (ION) in assisting faculty to develop and deliver online courses. One of the programs they incorporated was a “Making the Virtual Classroom a Reality” series of

courses for faculty members, which were delivered online. These courses and the faculty summer institute were popular with faculty members and were instrumental in improving the faculty development climate at the university.

Truman and Sorg (1997) at the University of Central Florida described how the first course offered online was used as a learning exercise to help improve future courses. Before other courses were offered, interactive course development workshops were held, which faculty teaching online courses were expected to attend. Another formative evaluation was done after running eight new courses online. This evaluation revealed a need for more hands-on activities. As a result, the next workshops were expanded and redesigned with an extra one-and-a-half hours of computer activities. Since then, these workshops have continued to be offered with an increase in faculty member participation and more online courses offered at the university. The research findings support the need for intensive and sustained efforts on the part of change agents to encourage the use of online courses. In a more recent article, Truman (2004) discussed the development and importance of the university's "Institutionalized Faculty Support Ecosystem." She credited this system, which includes a variety of supports for faculty and established processes, with having transformed the campus.

Abbey (1997) outlined the early efforts of a small university in the Southwest United States to increase faculty integration of technology into teaching. The plan involved attracting and training early adopters who, by demonstrating successful use, would then help convince other mid- to late-adopting professors of the usefulness of technology. The approach of concentrating on a small group of teachers who show interest in using technology seems to have many advantages over a strategy that aims to

encourage immediate adoption over the whole system. Early adopters may provide valuable insights into the integration process that can help guide further implementation. Indeed, both Moore (1995) and Rogers (2003) recognized the critical role that early adopters play as advocates and demonstrators of innovations within their peer group. Attempts to move directly to wide-scale adoption, without the support of a group of early adopters, is almost always doomed to failure. This is especially true in cases where the innovation involves dramatic change from past practice.

Previous research has been conducted to investigate how the presence of information and communications technology is changing communication patterns within organizations, including scholarly communities. Genoni, Merrick, and Willson (2005) examined the use of the Internet to activate latent ties in scholarly communities. Based on the results from a survey of professors at an Australian university, it was determined that the Internet had played a significant role in activating ties that might not have otherwise been made. This research builds on findings of earlier researchers in the area of communication networks. Granovetter (1973) demonstrated that weak ties can have strong effects on the diffusion of new ideas. More than two decades later, Constant, Sproull, and Kiesler (1996) examined how people use e-mail to seek technical advice from “strangers” or those with whom they had “weak ties.” They learned that when individuals were contacted, they provided useful advice and information, despite not knowing the person making the request.

Haythornthwaite has completed a great deal of research on the impact of the Internet on communication in academic environments. Haythornthwaite (2002) examined how new media affect the communication patterns between people with various kinds of

relationships. In a more recent study, Haythornthwaite (2005) focused more specifically on the impact of Internet connectivity in academic environments. In these studies she found that those that had strong ties with others were more likely to use new media to communicate. The results related to weak ties were somewhat less clear. While those with weak ties were less likely to get new media to communicate, they were inclined to use e-mail, if it was commonly used within their group, as an easy-to-use opportunistic means of communication. Likewise, participants in the study revealed that e-mail makes it easier to communicate and activate latent ties. Nentwich (2005) provided further insight into how the use of information and communication technology is causing “a complex process of change” in communication among scholars. Nentwich found that not only are professors communicating directly with others about their work, but they are also using electronic platforms such as e-journals and e-conferences to present their work to a wider audience and initiate interactions.

Archer, Garrison, and Anderson (1999) applied Christensen’s (1997) ideas concerning the adoption of disruptive technologies, to the post-secondary education environment. They speculated that just as “great firms” fail because they do not accept disruptive technologies, traditional universities could fail because of new challenges from organizations offering online courses. As an adaptation of Christensen’s strategy of creating an independent entity to develop new technology, Archer et al. suggested using a division of continuing studies or a similar group as an incubator for new technology. Developing the capacity to change, according to Duderstadt (1998), is the most critical challenge facing educational institutions. Those that can change will thrive, while those who “rigidly defend the status quo” are at very high risk of diminishing in importance

during such times of flux. Duderstadt argues that new emerging “mega-universities” could take the place of traditional universities.

This section has examined literature related to the nature of universities and the changes being brought about within them by the increasing presence of information and communication technology. Also, literature related to the presence of change agents and the supports put in place by universities to encourage the adoption of technology was studied. Findings reveal how the development of communication channels and organizational strategies that can be used to promote adoption should be encouraged.

Dynamics of Individual Agency

The core level of analysis in this study is the individual professor. The professor exists within the context of an institution and also within a broader social context. This section examines the literature in relation to how individual professors make decisions about the adoption of online courses. First, the study will look at literature related to the nature of change that individuals must make as they adopt asynchronous online courses. Second, literature will be explored that looks at the decision-making process professors go through as they decide to teach an online course.

Significant change is required by individual professors as they adopt the use of online courses. McFadden, Marsh, and Price (1999) claimed that the major obstacle to the integration of online courses is that they significantly alter the role of the instructor. Online courses are a disruptive technology in the sense that they require different pedagogical methods, which may not yet be fully understood. In many ways, these methods are a break from the past and require professors to rethink their teaching practice. In addition to this disruption, changes in the online course process have yet to

stabilize. Possibilities, such as hybrid courses and programs, are emerging that include innovations such as video conferences, chat sessions, and asynchronous discussions.

Conrad (2004) conducted interviews with university instructors who were engaged in online teaching for the first time. She identifies in her work four areas in which online courses changed instructors' roles: pedagogical, social, managerial, and technical. Conrad observed that professors were experiencing difficulty in adjusting to the role change as they transferred to online teaching. Others, such as Pelz (2004), have also contributed to the development of online pedagogy and provide awareness as to how it is different from in-class instruction. Myers, Bennett, Brown, and Henderson (2004) suggested that younger, less experienced faculty are more likely to adopt new technologies compared to older, more experienced professors. Based on their findings, they speculate that while younger professors may be motivated to teach online courses to advance their careers, faculty with more experience require more substantial evidence of the effectiveness of such technology.

The offering of online courses is still a relatively new and evolving field of practice. Many authors have pointed out that teachers are still experimenting with this media to uncover the advantages and disadvantages of an online educational environment (Inglis, Ling, & Joosten, 2002; Shotsberger & Vetter, 2000; Tisdell et al., 2004). In an earlier article related to online delivery, Jones (1996) shared his experiences offering online courses. He found that online courses were productive, especially in cases where students were mature and comfortable with independent learning and computers. He observed a difference between "cyberspace natives," or those with prior experience using the Internet and "cyberspace immigrants," or those who were not comfortable with the

Internet or independent learning. Salmon and Giles (1997) of the Open University Business School in the United Kingdom concurred with Jones. They assert that key features of successful implementation include student familiarity with information technology in advance of the course, as well as online moderators (professors) being trained before they take responsibility for such courses.

These observations have been supported in more recent research. Hricko (2002) recognized the importance of preparing students and taking their views into account when developing an interactive online course. O'Regan (2003) investigated the students' emotions in online learning and found that they play a critical role. The kind of supports expected by online students have also been explored by Cain, Marrara, Pitre, and Armour (2003). They found that students often look to other students and course professors for support, rather than take advantage of the more formalized student support services. Similarly, a study conducted in Sweden by Ostlund (2005) revealed that learners appreciated both the social supports they received from other students, as well as the assistance in clarifying matters related to the course. The students in this study first met face-to-face on campus. Ostlund speculates that this was a significant factor in "generating feelings of security and community" within the class. In other cases, attempts have been made to develop an online orientation course that prepares students to learn online (Lynch, 2003).

The role of emotion in online learning was also explored by Lehman (2006). She investigated the role of emotion in creating a sense of presence online. Lehman developed a framework that covers seven key areas that professors and instructional designers should attend to when designing and teaching online courses: understanding the

participants; knowing the environment; being a team player; developing formats and strategies; creating interactive activities; integrating support; and monitoring for quality. Ketterer and Marsh (2006) predicted that professors and institutions will have to be more flexible in terms of instructional models in light of new information and communication technologies. They claim that traditional instructional models will be “increasingly problematic” with new technology, which in turn will result in new models being developed to improve service, reach more students, satisfy adult learners, and comply with changing government policy.

The nature of the online format and the degree of change required to teach that way has been explored by many researchers (Buckingham, 2003; Inglis et al., 2002; Meyer, 2004; Roval & Barnum, 2003; Wilson & Whitelock, 1998). A common finding across this research is that teachers and tutors experience some difficulty due to the lack of feedback provided in the online environment. The main advantage in face-to-face teaching is the immediacy of the response from students, in both language and gesture. Also, students form closer relationships while in class, as voice and body language are important in forging these relationships (Wilson & Whitelock).

Another issue evident in the literature is the increased amount of time it takes to develop and teach online courses. MacDonald and Thompson (2005) found that offering a quality online course requires a “significant investment of time and energy” (p. 19), particularly in organizations that are still in the process of establishing proper support services. MacDonald, Stodel, Thompson et al. (2005) suggested that the use of “learning objects”—small instructional units that can be reused in a number of different learning contexts—may be part of a solution to the issue of time. While also recognizing the

issues related to time, other researchers have identified some commonly perceived advantages of the online format, including (1) better quality of interactions because more thought is placed into responding, and (2) although the relationship may not be as close, students feel they are part of a broader community of students drawn from various regions and backgrounds (Cavanaugh, 2005; DiBiase, 2004; Lazarus, 2003; Meyer, 2003).

Evidence also exists in the literature that some professors are experimenting with nontraditional forms of evaluation or variations of previously used evaluation methods—for example, electronic portfolios (Abrami & Barrett, 2005; Mason, Pegler, & Weller, 2004) and online peer assessment (Wadhwa, Schulz, & Mann, 2006). Other researchers are working to advance the development of various kinds of evaluation software. For example, Attali and Burstein (2006) examined the automated essay scoring system “e-Rater,” while Rudner, Garcia and Welch (2006) looked at a similar system called “IntelliMetric.” The findings of Jocoy and DiBiase (2006) revealed that detecting and combating plagiarism in online courses is a difficult task that needs attention even when students are adult learners.

Several studies have been conducted to explore the innovation-decision process relating to the adoption of online courses by university professors. Wolcott and Bretts (1999) interviewed faculty that taught distance education courses, as well as those that did not. They concluded that the use of online courses means a “new era for higher education and a redefinition of faculty work” (p.1). They also found that the faculty that were participating in distance education were driven by intrinsic factors, such as personal satisfaction or the belief that they were helping their students, rather than by extrinsic

rewards, such as increased pay or promotions. Similarly, through a survey of faculty members, Daugherty and Funke (1998) identified two main reasons why faculty want to continue with online teaching: (1) they saw benefits for their students; and (2) they were motivated by their personal interest in the new instructional media.

Shea, Pickett, and Li (2005) investigated potential barriers to the continued growth in the adoption of online teaching. A survey of 913 professors uncovered that four variables were significantly associated with faculty satisfaction and the adoption of online teaching: level of interaction in the course; technical support available; positive experience in developing and teaching the course; and the discipline or subject area being taught. If universities want to encourage professors to teach online they should address issues in these four areas.

Bretts (1998) conducted a survey of faculty at George Washington University to identify factors influencing faculty participation in distance education. She found that early adopters may not be motivated by the same factors as late adopters. While early adopters were motivated by more altruistic factors such as helping others and following a personal interest, the late adopters were motivated by such factors as monetary benefits and release time. The different motivating and inhibiting factors between those offering distance education and those not offering it, is consistent with the analysis of the various categories of adopters by Rogers (2003). Other researchers (e.g., Dooley & Murphrey, 2000; Maguire, 2005; Parker, 2003) have examined the literature related to motivations and incentives for faculty members who teach online courses and found similar results; most professors teach online for intrinsic rewards such as self-satisfaction, flexibility with scheduling, and the ability to reach a wider audience.

Literature related to the nature of the change that individuals have to make as they adopt asynchronous online courses reveals that instructors consider change to be “discontinuous”—that is, online courses require significant change from previous practice. The literature examined provides a level of understanding regarding how difficult the transition from classroom to online teaching is for many professors. Some of the factors that relate to professors’ decision to teach online have been identified, yet gaps are still apparent in the literature in terms of fully understanding the decision process. While research has identified specific inhibitors and motivators for adoption, further investigation is still needed.

Summary

A review of literature is the initial step in gathering information for research. It helps the researcher identify theories and concepts relevant to the study and involves a review of the work of other researchers in the area of study. In this chapter, a broad review of the literature related to the general adoption of technology was first undertaken. Next, a focused examination of literature pertaining specifically to the adoption of online courses at universities was conducted. In both instances, the literature was subdivided into three interconnected levels of analysis, namely societal, institutional, and individual. The next steps involve using the literature review to develop research questions and a conceptual framework that will be applied to guide the research and organize the findings.

Research Questions

The main research question for this study is: How do various factors impact the adoption of asynchronous online courses by university professors? From this main

research question three sub-questions arise: (1) How do societal factors affect the adoption of online courses by professors? (2) How do institutional factors affect the adoption of online courses by university professors? and (3) How do individual factors affect the adoption of online courses by university professors?

Conceptual Framework

Through an examination of the literature related to this study—initially from a broad theoretical perspective, then with a more in-depth study related to university professors' adoption of asynchronous online courses—two groups of theories of change have emerged as being particularly important to this study. The social constructivist theories (i.e., SCOTS, the Actor-Network Theory, and the Technological Systems Theory) and theories that focus on adoption (e.g., Rogers' diffusion of innovation theory) were both drawn from in the development of the conceptual framework for this study. The social constructivist theories of change focus on the societal factors that shape technology and how it is used. Some scholars would argue that these theories offer a less deterministic way of looking at technological change than the theories of change that have been predominately used in the field of education for the past four decades. While theories such as Rogers' (2003) diffusion theory do not give as extensive an analysis of the social factors involved in the development and use of new technology, their strength lies in their practical nature and ability to provide workable guidelines for those who are promoting the adoption of a new technology. The conceptual framework for this study (see Figure 3) preserves the strengths of each of these theoretical perspectives and presents a more holistic framework for answering the research questions.

The conceptual framework provides three sequential, yet interconnected, dimensions of scale: societal, institutional, and individual. The interconnected nature of these separate levels of analysis is illustrated in the conceptual framework (see Figure 3) by the two-way arrows that show the influence between the three levels. Individual professors are located within the larger context of the university, which is itself part of a broader society. The individual has the potential to influence the institution and society but may also be affected by the institutional and societal context within which they exist. This framework also operationalizes and expands on the idea of Misa (1994) that any analysis of technology adoption should include both macro and micro factors.

Within each level, a number of factors affect the adoption of technology. On the societal level, these factors include the perceptions of relevant social groups (Bijker, 1995; Lindsay, 2005; Rogers, 2003), economic models (Cowan, 1989; Schot and Bruheze, 2005), technological momentum (Hughes, 1989, 2005), nonhuman actors—such as the physical environment—(Callon, 1989; Law, 1989), and political factors (Bijker, 1995; Callon; Kline, 2005; Laegan, 2005; Law; Tenner, 2003; Van Oost, 2005).

While Rogers (2003) did not provide as extensive an analysis of social factors as some of the social constructionists have, he did recognize the importance of the nature of the social system as one of the five variables determining the rate of adoption. He also noted that the “perceived attributes” of the innovation are in many ways socially constructed. During the adoption stage, individuals look for information about the innovation and how it works, while also evaluating information about the advantages and consequences of the innovation. An examination of the patterns in the development of

other technologies provides clues as to what patterns might exist in the introduction of asynchronous online courses at universities.

The variables included in the individual and institutional levels are also based on existing theories of change and information related to the study of the introduction of online courses or information and communication technology into educational institutions. At the institutional level, factors that affect the adoption include: communication channels (Granovetter, 1973; Pinch, 2005; Rogers, 2003); the nature of the social system (Daniel, 2000; Daniels, 1996; Laidler, 2002; Miller, Martineau, & Clark, 2000; Noam, 1995; Psycharis, 2005; Singleton-Jackson & Newsom, 2006; Rajasingham, 2005; Rogers); and the presence of change agents (Fullan & Stiegebauer, 1991; Havelock & Zlotolow, 1995; Rogers).

In terms of individual agency, three main factors impact adoption: (1) the innovation decision process, (2) the nature of the change required by individuals as they adopt the use of new technology; and (3) the factors impacting individuals' decisions as they determine whether or not to adopt a specific technology. The type of innovation decision process that professors operate under is important (Billett, 2006; Dillion & Morris, 1996; Rogers, 2003). The significant nature of the change required by professors when they move to teaching online courses has been documented (Conrad, 2004; McFadden, Marsh, & Price, 1999; Myers, Bennett, Brown, & Henderson, 2004; Pelz, 2004). Online courses are a "disruptive technology" in the sense that they not only bring about organizational change but also require "disruption" at the individual level as well.

Other variables that impact the decision-making process of individuals include self-efficacy (Bandura, 1986, 2006), specifically computer self-efficacy (Agarwal et al.,

2000; Compeau & Higgins, 1995; Davis, 1996); individuals' perceptions of the innovations (Davis, 1989; Hall & Hord, 2005; Rogers, 2003); the level of innovativeness of the adopter (Rogers); and views on the use of technology (Hughes, 1989; Kline, 2005; Laegran, 2005; Lindsay, 2005; Wyatt, 2005). Specifically in terms of online courses, several researchers have investigated how online courses impact factors such as time management and job satisfaction among professors (Bretts, 1998; Maguire, 2005; Parker, 2003; Shea, Pickett, & Li, 2005).

The conceptual framework presented here provides a useful guideline for organizing the findings of this research. The conceptual framework accommodates both social constructivist theories of change, as well as those that focus on the power of the innovation to "determine" change in society (e.g., Rogers' [2003] theory of diffusion). As such, it is grounded in constructivist theory.

The literature reviewed in this chapter, along with the existing theories of change, provides the basis for the research questions and the development of the interview guide (Appendix A). This guide was designed to gather information to answer the main research question of this study: how do various factors impact on the adoption of asynchronous online courses by university professors? The conceptual framework also provides a structure for the three sub-questions that flow from this main question. The sub-questions related to each of the three levels of analysis are: (1) How do societal factors affect the adoption of online courses by professors? (2) How do institutional factors affect the adoption of online courses by university professors? and (3) How do individuals factors affect the adoption of online courses by university professors?

While much has been written about online courses and technological change in general, many unanswered questions and areas still require exploration. This research adds to current understanding by examining these questions using a qualitative methodology, which will be described in the next chapter. This methodology provides a way of gaining insight into some of the issues identified in the literature review; as it also identifies and explores new issues that have not received attention in the present literature.

CHAPTER 3

METHODOLOGY

Literature related to the broad topic of technological change, as well as that specifically concerning online courses at the university level has been reviewed. Based on this review, research questions and a conceptual framework were developed. In this chapter, the methodology used to gather the data to provide answers to the research questions will be delineated.

Research Questions

For qualitative research, McMillan and Schumacher (1997) advocated that stating research problems in question form is preferable because, as well as being simple and direct, “psychologically, it orients the researcher to the immediate task; to develop a design to answer the question” (p. 92). The following research question and sub-questions guided this study:

How do various factors impact the adoption of asynchronous online courses by university professors?

- (1) How do societal factors affect the adoption of online courses by professors?
- (2) How do institutional factors affect the adoption of online courses by university professors?
- (3) How do individual factors affect the adoption of online courses by university professors?

Research Design

In this study, in-depth qualitative interviews were used to gather information related to professors' adoption and use of asynchronous online courses. A case study approach was adopted using a university (MUN) that is a leader in the use of online courses as the case. Further, a constructivist grounded theory approach was used, thus incorporating existing theory and literature into the design of the interview guide. Such an approach emphasizes the pragmatic aspects of grounded theory while challenging earlier assumptions about the objectivity of researchers (Charmaz, 2000).

Qualitative methods

A qualitative research method was chosen to provide insight into the adoption of online courses by university professors, and by conducting an in-depth examination of the professors' experiences, insight into the change process for these professors was gained. Creswell (1998) proposed guidelines as to when researchers should use qualitative methods. The nature of the research question will govern whether qualitative methods are appropriate. As Creswell states: "In a qualitative study, the research question often starts with a how or a what so that initial forays into the topic describe what is going on" (Creswell, p. 17). Other reasons for choosing qualitative methods are when the topic needs to be explored: "When variables cannot be easily identified, theories are not available to explain behaviour of participants or their population of study, and theories need to be developed" (Creswell, p. 17). In this study, while theories of change exist in the area, further research is needed to assess the usefulness of these theories in the context of the adoption of asynchronous online courses.

Case study approach

There has been much academic debate surrounding what constitutes a case study and how case studies are different from other approaches to research (Ragin & Becker, 1992; Stake, 2005). Case studies have been used for a number of years in various fields of study. In fields such as medicine, law, and business case studies are commonly used as part of a teaching technique. In other fields, such as sociology, anthropology, history, and education, case studies are more commonly used as a research approach. In this research, the case study is used to examine a “bounded system” (Creswell, 1998, p. 61) and support the close examination of the event, instance, or experience in question (McKee, 2004). This is a case study of professors’ adoption of asynchronous online courses at Memorial University of Newfoundland.

There has been much academic debate surrounding the strengths and weaknesses of the case study approach. In addressing the strengths of the case study, McKee says the following:

[The case study] supports reflection and rethinking, enabling the reader to learn more about and from their own experiences. Case studies also take readers beyond their experiences. Generalizations also occur when the reader, understanding the uniqueness of the case, judges what ‘findings’ are applicable to their situation or needs and what are not. Authors of case studies often enhance generalization through their analysis and debate. (p. 7)

In support of the case study approach, Flyvbjerg (2006) outlined five misunderstandings about case-study research and challenged conventional wisdom. The misunderstandings he examined were that: (1) theoretical knowledge is more valuable than practical

knowledge; (2) one cannot generalize from a single case; therefore, the single-case study cannot contribute to scientific development; (3) the case study is most useful for generating hypotheses, whereas other methods are more suitable for hypotheses testing and theory building; (4) the case study contains a bias toward verification; and (5) it is often difficult to summarize specific case studies. In challenging these conventional beliefs, Flyvbjerg strongly asserts the value of case study research.

The emergence of generalizations from a single case has a long history. One form of generalization is the “naturalistic generalization,” which supports transfer of findings to other similar situations (Gomm, Hammersley, & Foster, 2000). Also, Morton (1967) forwarded the idea of middle range theories or those, he states, that:

... lie between the minor but necessary working hypotheses . and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behavior, social organizations and social change. (p. 39)

Morton sees these middle-range theories as useful in the development of a more general theory. Further research often benefits from and is guided by the assertions of middle range theories.

Flyvbjerg (2006) also commented on how case studies should be written:

Good narratives typically approach the complexities and contradictions of real life. . . . This tends to be seen by critics of the case study as a drawback. To the case study researcher, however, a particularly ‘thick’ and hard-to-summarize narrative is not a problem. Rather, it is often a sign that the study has uncovered a particularly rich problematic. The question, therefore, is whether the summarizing and generalization, which the critics see as an ideal, is always desirable. (p. 237)

He continues to emphasize the value of allowing complex stories to evolve when discussing the way the findings of case studies should be presented:

It is a 'virtual reality,' so to speak. For the reader willing to enter this reality and explore it inside and out, the payback is meant to be a sensitivity to the issues at hand that cannot be obtained from theory. (Flyvbjerg, p. 238)

Flyvbjerg also emphasizes that "something essential" may be lost in summarizing or erasing details "in favour of conceptual closure" (p. 239).

Stake (2005) categorized case studies into three types based on methodological orientation: intrinsic, instrumental, and collective. The intrinsic case study is undertaken to get a better understanding of one particular case. The instrumental case study is examined to "provide insight into an issue or to redraw a generalization" (p. 445). The collective case study is an extension of the instrumental study involving several cases. It is often difficult to distinguish between these various methodological orientations as Stake explained in describing the difference between the intrinsic and instrumental case study:

The case still is looked at in depth, its contexts scrutinized and its ordinary activities detailed, but all because this helps us pursue the external interest . . . We simultaneously have several interests, particular and general. There is no hard-and-fast line distinguishing intrinsic case study from instrumental, but rather a zone of combined purpose. (p. 445)

This case study is instrumental; as well as paying particular attention to the bounded case of Memorial University it also provides insight that may be useful in a broader context.

Research Paradigm

Qualitative research deals with multiple, socially constructed realities or qualities that are complex and difficult to divide into discrete quantifiable variables (Glesne & Peshkin, 1992). An interpretation of professors' adoption of online courses will be drawn from the perspectives of the participants. As Miles and Huberman (1994) indicated:

Qualitative data, with their emphasis on people's lived experience, are fundamentally well suited for locating the meaning people place on the events, processes, and structures of their lives: their "perceptions, assumptions, prejudgments, presuppositions" and for connecting these meanings to the social world around them. (p. 10)

The philosophical grounding of the qualitative approach to research is usually based on two factors (Bryman, 1988). One factor, as Bryman noted, is that the social sciences are fundamentally different from the natural sciences; understanding people and their social realities requires a different method to the study of the natural sciences. A second factor involves the idea that any attempt to understand individual and social situations must be based on a study of their experiences of that social reality. Many characteristics of qualitative research make it suitable for investigating the use of information and communication technology in learning environments. Through adopting a qualitative approach, university professors were able to express their points of view on what is happening in this field. Further, the context in which events took place was explored and taken into account. Qualitative research tends to favour a strategy that is relatively open and unstructured, rather than one that is a rigid and predetermined frame of reference. This flexible research structure provides opportunities for the researcher to

discover unexpected issues that may be of importance to the study. This is a critical point in this study, given the newness of this area of study and the continuing evolution of the technology.

Grounded Theory

The purpose of this study is to build on the existing research and theoretical literature and move toward developing understandings specifically related to factors that impact the adoption of asynchronous online courses by university professors. The beginning of grounded theory can be traced to the early collaborative work of sociologists Glaser and Strauss. In *The Discovery of Grounded Theory* (1967) they outlined the methods they had used in an earlier study of death in hospitals. With their guidelines on how to collect and analyze data in order to develop theory grounded in the data, they challenged the widely accepted quantitative methods of doing research. After their original collaboration on this very influential book, Glaser and Strauss moved in different directions as they promoted the further development of grounded theory methods (Charmaz, 2006). Glaser (1978) advocated a more positivist approach to grounded theory, emphasizing the importance of remaining an objective gather and neutral analyzer of the data. Strauss, now working with Corbin (1990, 1998), advocated a more subjective approach to research involving socially created meaning and a more open-ended approach. Charmaz (2000, 2005, 2006) expanded on the work of Strauss and Corbin (1990, 1998) and explained how constructivist grounded theory is different from that grounded in the positivist approach. Charmaz (2000) outlined the difference between her approach and that of Glaser, in terms of the unbiased gathering of data:

[A] constructivist approach recognizes that the categories, concepts, and theoretical level of an analysis emerge from the researcher's interactions within the field and questions about the data. In short, the narrowing of research question, the creation of concepts and categories, and the integration of constructed theoretical framework reflect what and how the researcher thinks and does about shaping and collecting the data. (p. 522)

While grounded theory generally focuses on findings from the data, some prominent grounded theorists have emphasized the role of existing literature and theory (Charmaz, 2000, 2006; Strauss & Corbin, 1990, 1998). They acknowledge that existing literature can provide concepts and relationships that can be checked against the data and enhance theoretical sensitivities in ways that help generate useful interview questions.

Strauss and Corbin (1990) explained how existing theories can perform a similar role:

If one is interested in extending an already existing theory, then one might begin with the existing theory and attempt to uncover how it applies to new and varied situations, as differentiated from those situations to which it was originally applied. . . . The original theory could then be amended, added to, or modified to fit those particular situations. (p. 51)

In this study, an extensive review of the existing theory and relevant literature was done to enhance theoretical sensitivity, while methods of data collection and analysis were used to allow findings to evolve from the data. As Charmaz (2006) noted, "Lines often blur between a literature review and a theoretical framework" (p. 163). This research shows that the literature review, research questions, and the conceptual framework have strong ties. The purpose of the study is to expand on existing research and move toward

the development of an understanding concerning the factors that impact the adoption of asynchronous online courses by university professors.

Research Site

Memorial University of Newfoundland was the site for this research. Memorial University is the largest university in Atlantic Canada and the only university in Newfoundland and Labrador. There are 17,000 students engaged in full- and part-time studies at undergraduate and graduate levels at the university. The university employs 950 full-time faculty, 850 sessional instructors, and 2,300 administrative and support staff (Memorial University, 2006). It has campuses in St. John's, Newfoundland, Corner Brook, Newfoundland, and a smaller campus in Harlow, England. Undergraduate and graduate degrees, as well as diploma and certificate programs, are offered in the faculties of arts, business, education, engineering, medicine, music, nursing, pharmacy, physical education, science, and social work. The institution was founded in 1925 as Memorial University College and was granted university status in 1949 when it was rededicated to honour the province's casualties from the World Wars.

Newfoundland and Labrador has a sparse population of 515,991 (Newfoundland and Labrador Statistics Agency, 2006) spread over a huge geographic area (see Figures 4 and 5). The province is also faced with variable and often harsh climatic conditions. These geographic and climatic conditions may have provided the impetus for the university to become a leader in the development of distance education. The province is located on Canada's East Coast, with the island portion of the province located in the Gulf of St. Lawrence and the larger Labrador portion on the Canadian mainland. The total area of the province is 405,720 square kilometres, which is more than three times

the size of the other Atlantic provinces combined (Nova Scotia, New Brunswick, and Prince Edward Island). If it were one of the United States, Newfoundland and Labrador would rank fourth in size behind Alaska, Texas, and California. It is almost one and three quarters the size of Great Britain.

The early settlement patterns of the province were influenced by the reliance on the fishing industry, which resulted in most of the population being widely spread in small communities along the more than 17,000 kilometres of coastline (O'Flaherty, 1999). The enormous but sparsely populated area of Newfoundland and Labrador, with its severe geographic and climatic conditions, has posed a number of challenges to the traditional on-campus mode of university education.

As well as the physical conditions, many social pressures add to the momentum to use technology to overcome these challenges—rather than pursuing other possible solutions. The reaction to the resettlement efforts of the government in the 1960s and the more recent emphasis placed on rural development provides evidence of a political culture that guides policy decisions (Inverson & Matthews, 1968; Matthews, 1978; Morgan, 1997). The political dynamics and the culture of the province also put pressure on governments and public institutions to provide services to rural areas, as shown in various government documents (Government of Newfoundland and Labrador, 2007; Government of Newfoundland and Labrador, 2006a). The commitment to use information and communication technology as a tool for social and economic development is apparent in the investment made by successive governments to expand broadband Internet services to rural communities throughout the province (Government of Newfoundland and Labrador, 2006b). The use of online courses to reach dispersed

populations has also been noted in other institutions—for example, the University of Ottawa's efforts to meet the needs of the French population in Ontario (Desjardins, 2003, 2005).

Over the past 30 years, MUN has a demonstrated record of leadership in distance education and educational technology. In the 1960s and 1970s, the university was a pioneer in the use of educational television. The first course using e-mail was introduced in 1988 and the first online course was introduced in 1994—well before many other institutions in Canada and around the world. Today, the university offers online degree and certificate programs in many areas. At the time of data collection, MUN offered more than 250 distance courses to more than 13,000 students each year. Distance programs were offered in areas such as business, education, health, maritime studies, social work, and technology. Courses were offered in 22 different disciplines, in eight different faculties, and 150 were delivered, in whole or in part, via the Internet.

The office of Distance Education and Learning Technologies (DELT) at MUN offers support services for online courses at the university (DELT, 2006). Course development services such as the production of videos, still or animated graphics, and simulations are provided by professionals who work with the professor and instructional designer in a course development team. The instructional designer assists the faculty members in the selection and application of media and tools for the online course. Other support services offered to professors include the handling of administrative functions, such as copyright clearance, managing exam invigilation, and training. Many faculties and departments at MUN also have technical support people located close to the professors to help in the early stages of adoption. Services offered to the students include

a help desk and the distribution of course materials, assignments, and exams. DELT also supports on-campus teaching and the integration of technology into classroom teaching. The office has also undertaken external projects related to education and the use of information and communication technology at the national and international level.

Participants

A written invitation to participate in this study was sent to all 84 professors at MUN who had taught or were teaching online courses (Appendix B). A follow-up email was sent four weeks later. Thirty-two professors agreed to participate. The sample was purposeful in the sense that these professors were chosen because of their adoption of online courses. Also, theoretical sampling was used in the form of a follow-up e-mail to encourage participation of professors who taught in subject areas not already included in the study. Such an approach is supported by experts in grounded theory methodology as a way to follow emerging concepts (Charmaz, 2006; Glaser, 1978; Strauss & Corbin, 1998). Because of the low number of professors teaching in some subject areas, reliance on random sampling most likely would have missed important variations across subject areas.

As the demographic information presented in Appendix D demonstrates, the purposeful sampling provided a varied section of the individuals offering online courses at the university. The sample included an equal number of males ($n = 16$) and females ($n = 16$) and both full-time ($n = 24$) and part-time ($n = 8$) professors. The professors varied in age from 30 to 70 years, with the vast majority ($n = 29$) between the ages of 40 and 60 years. In terms of qualifications and experience, the sample included 12 professors with masters' degrees and 20 with doctoral degrees. Seventeen of the professors had more than

20 years teaching experience, while only five had less than one year of experience.

Professors also had varied experience teaching online courses. Some of these professors were just starting to teach in this medium while others had used this format for more than five years. The sample was drawn from various subject areas including: medical/ nursing ($n = 7$), business ($n = 5$), education ($n = 6$), arts/ social work ($n = 9$), and math and science ($n = 2$).

Data Collection

The main source of data was in-depth, semi-structured qualitative interviews with the 32 professors. Initial contact was made with potential participants during the fall session, 2002, and interviews were conducted at their earliest convenience. All the interviews were completed by the summer, 2003. The interviews were conducted in person at a time and place that was convenient for the participant, usually in their office. Interviews lasted from 45 minutes to two hours.

Interviews were conducted with the aid of an interview guide book. The interview guide (Appendix A) was developed based on a review of the relevant literature and related theories of change as is consistent with the constructivist grounded theory approach (Charmaz, 2000, 2006). The openness of semi-structured interviews allowed for an in-depth examination of the phenomenon being studied; that is, the experiences of professors at MUN who taught or had taught online. McCracken (1988) suggested:

The long interview is one of the most powerful methods in the qualitative armoury. For certain descriptive and analytic purposes, no instrument of inquiry is more revealing. The method can take us into the mental world of the individual, to glimpse the categories and logic by which he or she sees the world. It can also

take us into the life world of the individual, to see the content and pattern of daily experience. The long interview gives us the opportunity to step into the mind of another person, to see and experience the world as they do themselves. (p. 9)

There are several advantages of using a semi-structured interview rather than an unstructured conversation. First, the use of an interview guide provides consistency from one interview to the next, thereby facilitating comparison of data (Merriam & Simpson, 1995). Second, the use of specific questions assures that important topics, possibly overlooked by the interviewee, will be asked (Berge, 1995).

Additional sources of data were sought for purposes of triangulation. Professors completed the CBAM stages of concern questionnaire (Appendix C). In addition, three informal, unstructured interviews were conducted with DELT staff to gain background information on the history of online courses at the university, to explore their perceptions of the adoption of online courses by professors, and to get a better understanding of the services they offer faculty. Also, planning documents and professional development material from the university were examined.

Data Analysis

The 32 interviews with the professors were audio-taped and transcribed by the researcher. During the transcription, initial categories and comparisons were developed as recommended by Maxwell (1996). Gay and Airasian (2000) outlined the steps involved in analyzing qualitative research data:

This cyclical process focuses on (1) becoming familiar with the data and identifying main themes in [them] (reading / memo use); (2) examining the data in depth to provide detailed descriptions of the setting, participants, and activities

(describing); (3) categorizing and coding pieces of data and physically grouping them into themes (classifying); and (4) interpreting and synthesizing the organized data into general conclusions or understandings (interpreting). (p. 239)

The research questions and related literature provided guidelines for the categories during data analysis. However, flexibility was maintained in order to accommodate any unexpected findings as suggested by Marshall and Rossman (1999). Further categories were developed by close examination of the transcripts to identify patterns and themes. Bogdan and Biklen (1992) suggested a strategy for developing coding categories:

You search through your data for regularities and patterns as well as for topics your data cover, and you write down words and phrases to represent these topics and patterns. These words and phrases are coding categories. They are a means of sorting the descriptive data you have collected so that the material bearing on a given topic can be physically separated from other data. (p. 166)

As the coding of the data continued, categories were refined. During the process of interviewing, transcribing, and refining the data, analytical memos were written to help facilitate the analysis as suggested in both Maxwell (1996) and Glesne and Peshkin (1992). As the data analysis progressed, the researcher explored implications of the data. Throughout this process, techniques for enhancing theoretical sensitivity were employed as suggested by Strauss and Corbin (1990). These included the use of questioning; the analysis of a single word, phrase, or sentence; the flip-flop procedure; the making of comparisons, both close-in and far-out; and waving the red flag.

The use of other sources of data, such as information from interviews with support staff and the CBAM stages of concern questionnaire, provided a form of data triangulation. Several theories of change were examined and used to help analyze the data. This theoretical triangulation helped prevent biases and enhanced the scope, density, and clarity of the findings (LeCompte & Preissle, 1993). Further, this approach placed the responsibility for the construction of plausible explanations about the phenomena being studied with the researcher (Mathison, 1988).

Ethical Considerations

In any research involving human subjects it is important to follow proper ethical procedures. Consent forms (Appendix B) were signed and obtained from all the participants involved in the research. Participants were informed of the measures taken to ensure anonymity, such as the use of codes rather than names in interview transcripts. Participants were also informed of their freedom to withdraw from the study at any time or to refrain from answering any questions they did not want to answer. It was made clear to participants that the interview was not an evaluation of their performance as professors. Rather, the purpose was to obtain information and insight into the adoption of online courses. The data from the study were securely stored at all times. Ethical approval of the study was obtained from both the University of Ottawa and Memorial University of Newfoundland. Reciprocity is an important ethical consideration for researchers (Marshall & Rossman, 1999). Participants were told they could receive summaries of the findings and the final thesis if they wished.

Organization of Findings

Some grounded theorists, such as Glaser (1978, 2002), advocate delaying the examination of the literature until the data has been gathered. In this research, the examination of the literature was ongoing throughout the research process, as advocated by Charmaz (2006) and Strauss and Corbin (1998). The conceptual framework and research questions were used as a guide to help organize the data and present the findings. The main research question in this study was: How do various factors impact on the adoption of asynchronous online courses by university professors? From this main research question, three sub-questions emerged: (1) How do societal factors affect the adoption of online courses by professors? (2) How do institutional factors affect the adoption of online courses by university professors? and (3) How do individual factors affect the adoption of online courses by university professors? The next three chapters answer these three sub-questions. In the concluding chapter, the main research question will be answered and areas where further research is needed are highlighted.

CHAPTER 4

SOCIETAL LEVEL OF ANALYSIS

The purpose of this study is to determine how various factors impact the adoption of asynchronous online courses by university professors. In this chapter, the societal factors that affected adoption will be presented. Findings are presented in each of the four societal elements in the conceptual framework: perceptions held by relevant social groups, interaction of political factors and nonhuman actors, technical momentum and existing technology, and the economic model.

Perceptions Held by Relevant Social Groups

The perceptions of two relevant social groups emerged from this research: professors and students.

Professors

Professors identified both advantages and disadvantages of online teaching. This section explores the advantages and disadvantages as perceived by professors.

Advantages

Six advantages of teaching online emerged: (1) there is a record of what is said; (2) it is convenient for students and professors; (3) it encourages students to take more responsibility for their own learning; (4) it is easier to link to current resources online; (5) some students participate more online; and (6) discussions can be richer.

Professors emphasized that online courses provide a record of what was said in the course. Students can see the questions that have been asked and the comments that have been made. One professor (Prof. 001) stated that any problem areas in the course, which students need to be aware of, are placed in the permanent course records and are

accessible to all students. In a face-to-face class, some students may miss particular comments or announcements. Professor 008 discussed the importance of keeping a record of what is said in online courses:

If a student asked me a question at the end of [a face-to-face] class, then the rest of the class has gone. There is a benefit to e-mailing back the answer whenever I can, so I encourage them to send e-mails. (Prof. 008)

In fact, this professor believes that e-mail interactions are so meaningful that he is integrating them into his classroom course. Professor 017 explained how the written record of the course allowed him to be more systematic in how he assigned marks for participation. Also, due to the written record, online courses make forms of peer assessment more practical. Professor 017 referred to the developing possibilities as the “democratization of assessment.”

A second advantage that was important for the professors was convenience for students. In fact, many professors thought the main, if not the only, strength of online courses was that they accommodated the needs of certain students in a way that in-class courses could not. The professors’ online courses had a more flexible schedule than face-to-face classes and allowed students to participate from anywhere they had Internet access. Indeed, online learning opened up university courses to students who would not otherwise have been able to access these opportunities. This point will be discussed further in the section on the interaction of political factors and nonhuman actors.

Several professors mentioned that online courses did not only provide access to learning for students working at a distance, but other students also benefited from the availability of online learning. One professor (Prof. 011) said there were a lot of reasons

why students would want to take an online course. He had taught students online, including those with physical disabilities, who would not have been able to take the course had it been in the classroom.

Professor 015 noted that the increased flexibility of online courses was especially important for students who worked and had families. She knew many students who would not have obtained their degree if they had not been able to do it by distance education. Several professors talked about the importance of being flexible and accommodating students working in various professions. For example, nurses often work 12-hour shifts and it is difficult for them to commit to being in class at one particular time every week. Another factor was that students did not have to leave home in bad weather. In fact, class could continue regardless of the weather conditions.

Some professors mentioned that not only do online courses give students more flexibility, but they also allow the professor more flexibility. For instance, professors indicated they could continue to teach courses while on trips or living out of the province. Some professors pointed out that if they had a disability, they could teach from home. Professor 019 explained how teaching correspondence or online courses had given him the flexibility to spend more time with his young daughter. For another (Prof. 020), the flexibility allowed her to travel and conduct research.

A third advantage of online learning that emerged related to learner responsibility. Professors indicated that online learning requires students to be more responsible for their own learning and become more self-reliant. In an online course, students do not have material presented to them in the same way as in a classroom; they have to read the course material and seek out additional resources. Professor 007 noted that there could be

more accountability structured into an online course: “The fact that they have to participate and have to be on there, at least once a week, keeps them on their toes as well in terms of progressing with the course” (Prof. 007).

The currency of course content was a fourth advantage of online learning. Several professors mentioned that it was easy to refer students to the latest material as they could provide links directly from the discussion group. Professor 007 said she often directed students to Web sites related to course topics. For example, the class could link to online newspapers immediately if they contained something relevant to the course. This was especially useful in some subject areas where professors wanted to “draw in what is going on in the world.” Professor 019 thought online courses were more flexible than correspondence courses in terms of changing course content. With correspondence courses, once the course material is printed it is very difficult to modify. With an online course, the professor can use the discussion forum to add new material or deal with any items raised by students in the course.

Another advantage of online courses mentioned by a number of professors was that many students participated more online than in the classroom. As one professor said:

Sometimes students are actually more comfortable speaking in e-mail and not in class; a lot of people are intimidated to speak in class. So they are actually more forthcoming with ideas and issues and questions in that kind of context. (Prof. 001)

Similarly, Professor 007 commented that many people who would never talk in a classroom setting make more of a contribution online. Professor 024 noted that some students are more inclined to ask questions online than they are in class. In class, students

may feel intimidated, he said, but online they have more of a chance to ask questions without feeling as if they were interfering with the progress of the class. Furthermore, several professors noted that online courses permit professors to spend more time discussing things with individual students: “You can spend as much time as you want with any one particular student, working with that student individually through e-mail or through the chat line” (Prof. 012).

A final benefit that several professors drew attention to was that online courses provide a good forum for people to discuss class material:

Once it gets going it is much richer in that people are . . . doing a lot of thinking before they submit a response to someone else or to an exercise. . . . I find you get better, more thoughtful comments, usually, than you would in a class where students are more face-to-face responding to each other. (Prof. 010)

Several professors suggested that discussions were further enriched because out-of-province students participated in them:

I had two students who [had been to] Germany [and had] visited Auschwitz and . . . the Holocaust Museum. When we were in the online discussion talking about the persecution of Jews, these students were able to bring insights into their postings that were a helpful addition to the content. (Prof. 019)

Professors described how the nature of the class changes when individuals from other provinces or countries are included in the class. This permits a more thoughtful and vibrant exchange of ideas given the diversity of the people who can participate in an online course. Professor 034 believed that students learn more from each other because of these factors:

You can have people from a bigger pool or a bigger geographical area, which I think really enriches other student's experiences because they can learn from each other. They can find out you are not so provincial or so insular. (Prof. 034)

Several professors posited that the discussion in online courses can be more meaningful than classroom exchanges. They argued that students took more time to think and develop their ideas before putting them forward to the class in online courses. Some professors mentioned that they thought a stronger "sense of community" developed among students in online courses. Professor 014 noticed that students "learn to depend more on each other rather than on just the professor." This professor advocated having students take responsibility for particular components of the course and having the students critique each other's work. Professor 031 said he was initially concerned that students would not have the same interaction as they did in the classroom but found that students are very comfortable with the "virtual classroom." This professor, who had taught correspondence courses in the past, thought online courses held many advantages over correspondence courses:

I like teaching and part of it is the performance. For me, the most natural thing to do is to stand up in front of a group of students because they are with you, a shared experience; correspondence is really bad because you never get to really come across to the students at all. Online is not so bad; you never meet them, but you feel that you know them because you have been corresponding with them by e-mail, or you see their notes on the Web forum. So there are some significant advantages. (Prof. 031)

In summary, professors described specific pedagogical advantages of using online courses versus classroom courses. This is important because it challenges the commonly held belief, which is presented in the scholarly literature, that online courses are a “second rate” way of teaching.

Disadvantages

Despite the numerous advantages of online courses, professors also recognized there were some disadvantages to teaching online, which include the following: (1) online discussion is not as free flowing as face-to-face discussion; (2) online courses are not as enjoyable as face-to-face courses; (3) there is a loss of control by the professor when technical assistance is needed; (4) it is more difficult to teach online; (5) there are no time limits; (6) students get distracted by the many diversions available online; and (7) the various challenges that arise from the newness of the teaching medium. These points will be elaborated on in this section.

Several professors mentioned that a disadvantage of online courses is that discussion and conversation is not as free flowing as it is in the classroom. If an issue comes up in class, it is dealt with immediately and often leads to further discussion. Professor 010 suspected that some students hold back in online discussions because they do not receive feedback, such as body language, on their conversation. This professor thought students were “a little more hesitant” at the start of a course. Another professor (Prof 024) noted that students do not get to know each other as well online as they do in class. She contended that there is more of a free flow of conversation in the classroom and the discussion often goes beyond the content and creates strong personal relationships. The relationships between students and professors are important for a

number of reasons. Students often ask professors for reference letters after the course has finished. Also, in some cases, professors contact former students to get updated information on their workplace or to help with student placements for work terms.

Professor 024 explained that these important working relationships are built as a result of good in-class relationships. Professor 028 believed online students were missing much of the socialization that is a major part of “the coming together” that forms a university. She did not think this kind of interaction can happen online, even in real-time chat sessions because, typically, people do not type as much as they speak.

Several professors mentioned they thought teaching courses face-to-face was more enjoyable than teaching courses online. In part, this related to the difficulty of developing learning communities online. Professor 015 explained why she enjoyed teaching in-class courses more than online: “I miss that small group interaction and I miss getting to know the students. I miss being able to coach them directly and being able to observe, because I think these things play an important part in the course” (Prof. 015). Professor 002 said that while he recognized the need for online courses, he did not want to teach all his courses in that medium. In fact, he stated that if he were told he had to teach all his courses online he would leave the university.

Professor 003 felt students missed the interaction with other students, as well as with the professor. Professor 028 thought first-year students should learn on campus, rather than online, because of the socialization and skills they obtain from being in that environment. Another professor (Prof. 031) thought it was important that students “get to know each other.” Yet another (Prof. 017) argued that you do not get to know your students as well online as you do in class. He explained that you may even meet these

individuals somewhere and not know they are your students. Even Professor 023, who saw a place for online courses and intended to teach more of them in the future, still had concerns about the lack of interaction online:

I think that interaction is essential. I think pedagogical relationships are the hallmark of our education and I see the relationship suffering in a way. There is very little interaction, very little community, either between the students or with you as an instructor. It is very sterile teaching, but it is an effective means of teaching; it can augment the traditional learning [but] I am leery of it. (Prof. 023)

Professor 028, who thought the inability to read body language was the biggest problem when learning online, believed that his interaction with students was limited. He indicated that he did not know how far to push a student to improve his or her work. In the classroom, the professor could identify, through the visual cues of his students, possible reasons for poor work—an option that is often not available online.

Professor 022 talked about the lack of interaction as a major disadvantage in online courses. He decided to change the structure of the course because of the difficulty of interacting online:

We had to structure the course a little differently in what we expected the students to do. It is a little difficult to run those courses [the same way] online as I did it in the classroom. We had a group project for the students in the classroom. That would probably be a bit problematic, doing it online. (Prof 022)

Professors adapted the courses they taught based on the advantages and disadvantages of the teaching format. Many professors still viewed classroom teaching as the standard by which all others should be judged. Rather than exploring the new possibilities that might

be available, professors attempted to replicate classroom teaching in online courses. However, comments indicated that this mind-set may be slowly changing as more professors teach online.

Another comparison made between online and in-class courses is that a classroom setting “forces” students to keep up with the courses. One professor (Prof. 002) explained how the process of coming together as a class helped create an environment where students kept up with the rest of the class. For this professor, this environment could not be recreated online:

I believe to a certain extent it is a better experience for students to have the in-class delivery. Part of it is that it forces them to keep up; it forces them to follow the pace. That is much more difficult to do in an online course. In an online course I have got requirements that they have to be discussing the following topics in the textbook at this particular point in time. That is great for the people who want to keep up, but the people who want to coast can do so much more effectively. (Prof. 002)

Professor 007 thought some students might find online courses more demanding because of the reading that would be required in courses where students were making a lot of posts to the discussion forum.

In addition to stating that they did not find online classes as enjoyable, professors noted that it is more difficult to teach online as it is harder to explain concepts and takes more time to answer questions. Professor 011 explained the implications of this:

It is more difficult to do instruction online. It takes way more time, which is the biggest drawback. Then again, at some point in time this will have to be

rationalized in the context of workloads. That is going to be a really stubborn issue. Who knows? Maybe better technology will be set up and alter the work involved. (Prof. 011)

Another group of issues regarding the adoption of online courses, which will be discussed in more detail in chapter six, is that related to how it impacts professors' time management. Professor 012 said that because there is no set time limit as exists in a classroom setting, professors may find that they spend excessive amounts of time with online students.

If you have got 150 of them and the bell rings, they are gone, or when the hour is up they are gone, sort of thing. So that can be a bit of a quicksand situation too. (Prof. 012)

The newness of the teaching medium was another disadvantage mentioned by professors. Some professors noted that because the mode of delivery is still new, agreed upon operating procedures for courses are not clearly established yet. For example, how long should students wait for a response in an online course? Should there be a limit to the length of a posting? Professor 020 thought there was still some confusion about the expectations of response time for professors within online courses because of the newness of the teaching mode:

The e-mails can be a bit of an irritant because students want instantaneous responses. So we tried to set standards as to what is a reasonable amount of time for us to respond to them. I have tried marking assignments online, but do you know how long it takes you to mark an assignment online? We want to bend over

backwards to facilitate things with the students so it can be done completely electronically. (Prof. 020)

Yet another disadvantage of learning online related to student attention. Some professors postulated the time students commit to online courses might be more fragmented than that in a face-to-face course. Professors noted that many students were taking online courses because of their busy schedules. The fact that these students were so busy impacts on the kind of contribution they can make to the course. One professor (Prof. 002) explained that classroom-based courses force students to commit a three-hour solid block of time each week, whereas in an online course, Students “can allow 10 minutes here and 15 minutes there in a very fragmented way, which makes it more difficult for them to be completely involved in a Web experience” (Prof. 002). Professor 031 commented on the many distractions online and felt students got easily diverted:

They tend to spend more time and then they get lost. They get lost in time and they spend more time on the peripheral things and they forget about the crucial stuff, whereas, if you are in a correspondence course there is the book and there is nothing else to go to and if you are in class you are told what to do. (Prof. 031)

Several professors mentioned that some students are still uncomfortable being online but they do these courses because they are the only option available for completing their program. Professor 031 emphasized that different people have different learning styles and prefer different formats. Professor 014 pointed out that some students just do not like learning online:

Some students just do not like the Web. Some students need the face-to-face; they need the personal contact with the instructor and that is the biggest weakness.

Like I said, it is not for everybody. Some students will struggle; some students will procrastinate because they don't have to go to class. (Prof. 014)

Professor 033 said there were still many people who were uncomfortable doing online courses. These were usually older professionals who might be embarrassed by their lack of computer skills. Based on her experience, she found that once people got started they were able to overcome any problems they might have. However, she felt that the initial fear of trying something new holds a lot of people back.

Professors talked about the challenges of designing courses before they know the students. Many professors were concerned about the lack of feedback from students as compared with in-class teaching:

You can tell [in a classroom] whether the [students] are following what you are saying or not; you can tell whether they are interested. [If] you sense that they are being confused, you can adjust the pace, you can introduce another example to reinforce a point, all of that. With the correspondence or the Web-based courses, you are designing content a long time ahead of having any students. You have to be imagining what the students' vocabulary may be: what background knowledge they may have, what they know, what they don't know. (Prof. 019)

Another problem related to interactions is that, in communicating through e-mail, misinterpretation can occur. A quick message can come across as rude, or a question from a student can be unclear, in online communication. What might be resolved quickly in person can take extra time to clarify in an e-mail.

A final perceived disadvantage of online learning from the professors' perspectives relates to accessibility. Professor 028 was concerned that students in online

courses do not have the same access to the library and other services that the university offers. For example, if students have problems with writing papers, it is more difficult for them to get assistance from the writing centre. Lastly, some professors made the point that some of the costs are downloaded to students. One professor (Prof. 018) noted that students often end up paying for the printing of material that is put online.

In conclusion, the way in which professors perceive online courses is important, as these perceptions impact how an innovation develops and influences the rate of adoption. The participants in this study perceived a number of advantages and disadvantages to online courses. At the university where this research was conducted, for example, professors had the option of refusing to teach an online course. However, even in this context, pressure could be, and often was, exerted by others within the institutional context and the broader society.

The specific nature of the advantages and disadvantages of online courses that professors identified shows a level of reflective thinking about the use of online courses on the part of professors. The “technological frame” that they were developing often involved a comparison to classroom courses and in a few cases to other distance education modes. In terms of Rogers (2003) theoretical perspective these perceptions are valuable in that they influence the professor’s decision regarding continuation, and also influence the views of others with whom they discuss possible adoption. They are also important from the social constructivist perspective in that the views of professors play a role in shaping the development and use of the technology. Professors are one of many relevant social groups in relation to online courses. Findings related to another of these relevant social groups, students, will be presented next.

Students

An important factor in the adoption of online courses for many professors is how students feel about online courses. Some professors decided to teach online courses because they thought their students wanted them. While this research did not gather information directly from students, professors' perceptions of students' beliefs warrant consideration, because they influence professors' decisions to adopt and continue using online courses. Several themes emerged from the research in relation to how professors thought students perceived online courses. Professors believed students saw learning online as second best but took online courses because of the increased flexibility they provided in their schedule. Professors also expressed that some students feared technology and felt they were being forced or pressured into taking courses online. Other students, they said, had mixed feelings and some thought students were becoming more comfortable with online courses generally.

Professors noted that the fact that courses were being offered online changed the composition of their classes in some ways. Students were generally perceived to be older, more experienced, more likely to be married, more likely to have a job, more pragmatic, and more likely to reside out of the province or in a remote area. Professor 041 said that students in online courses are different from those in classroom courses in that they are more interested in getting credentials than an education:

My sense is that many people who do courses online, just the same as many who do correspondence courses, have very pragmatic objectives: we got to get this degree; we have got to get this grade. They get hung up on doing the assignments as opposed to learning the content. . . . So I get this sense of a pragmatic driving

force behind a lot of people taking online courses. It is not anti-intellectual but it is kind of nonintellectual. It is, 'this is a task to be done; let's do it and get it over with,' sort of thing, 'and get the credential.' As opposed to on campus, it is possible to develop a community of scholars; it is possible in a classroom setting to have broader interaction. (Prof. 041)

However, Professor 001 explained that, for the most part, the students she taught in her online courses had the same profile as the students in her in-class courses. A few exceptions were noted, such as students from other provinces who needed the course but couldn't take it at their university. She had previously taught many of the students in her online course in class and the main reason they took the online course was because of scheduling concerns. Indeed, Professor 008 said many students in his online course were either trying to do a degree part-time while working or were on-campus students who found it better in terms of time management. He had asked some on-campus students why they did not take the face-to-face version of the course that was being offered at the same time. They told him the online version allows them to study when they want and progress at their own pace. The professor explained that by making all his notes and assignments available on the first day of the course students have maximum flexibility.

Several professors noted that very few students send in feedback after the course is done, but if there was a serious problem the students would certainly let them know. One professor (Prof. 015) noted that she had received positive feedback in relation to several aspects of her online course. Students appreciated being able to do the course at home, being able to discuss things with other students at a distance, and submit

assignments by e-mail. Professor 001 mentioned that she experienced more negative feedback than positive, from online courses:

In the classroom you get the immediate feedback; either you get head nodding or you get questions. With this [the online course] you get more of a negative feedback. Unless they ask you questions, you don't know if they understand it. The presumption is if they are not asking me questions then they are OK. But I definitely don't have the same comfort level with respect to understanding the material. . . . You don't get that comfort level going; they don't understand this or, gee, they really did get that. (Prof. 001)

Professor 004 perceived that some students have a lower impression of online courses. They had had students who registered thinking they were getting a face-to-face course and were disappointed and "felt gypped" when they found out it was an online course. In most of these cases, the situation resolved itself once the students realized they would be getting a quality course with a real professor, real work, and interaction with other students. However, some of the participants still believed most students would prefer to do on-campus courses:

Most students prefer the on-campus form. That is my sense of it. I think the students and I do share the sense that this is a second-best form of teaching So, the main difference is the fact that you don't have the eye-to-eye personal contact, that person-to-person contact with the students, and they don't have as ready an access to you as they do when they see you in class. I find the various Web forums and electronic means of communication are certainly adequate but they don't substitute perfectly for the kind of person-to-person contact, face-to-

face, that standard delivery offers. . . . [However,] there are exceptions to this.

There are some students who definitely prefer the Web-based delivery because of the flexibility that it allows them to hold down a job, and they can study at night and whenever they have time. (Prof. 005)

This professor furthered that because online courses are seen as “second best” there is a perception among students that the requirements for the course should be less:

The onus is somehow on you, the instructor, to compensate for that by giving them easier exams or lowering the expectations or by giving them less difficult material to read. (Prof. 005)

Another issue mentioned by several professors was that students in online courses did not do as well as those in classroom courses. Although professor 018 believed this to be the case, she had not collected evidence to back up her belief. She forwarded the following hypothesis to explain the perceived performance gap:

I think the ones who do poorly are, by and large, the traditional students who look at distance courses as an easy way to get a course. Many of them are not disciplined enough to handle distance courses—in particular, this one because there are so many assignments to do. . . . Once they start missing deadlines then it starts to pile up on them and they kind of all of a sudden get in a jam because they can't meet the deadlines. Once they start to fall behind with a course like this [with] such a heavy workload, they can never do a good job and I think that happens to the younger students. The older students tend to be more disciplined [as] they know why they are doing the course. They have definite goals and they keep up. (Prof. 018)

Professor 029 also noted that the people who do not pass the course are usually those who have not completed the assignments. He felt “there is a problem with people not taking the course seriously.”

Several professors felt that the only major advantage of online courses for students is the flexibility they provide for students’ schedules. This is particularly true for those who live in remote areas and would have to move to another location to pursue educational opportunities, as well as those who work or have other responsibilities that make it difficult for them to follow a regular classroom course schedule. The professors noted that many students who could have taken a course in class had opted to take it online to provide more flexibility in their schedule.

Some professors perceived that there are students who have a fear of technology. Professor 004 noted that initially there was some resistance from students to do courses online. In some cases, she described this resistance as “horror” if the students did not have the basic computer skills needed for the course. This was the case for some mature practitioners who had worked in their field for quite a while and were returning to university. She said these kinds of problems usually worked themselves out early on in the course as students got help from friends, family, and the help desk at the university. Another professor (Prof. 014) mentioned that although she did not experience a lot of big problems she had noticed that some students are not comfortable with the technology:

Students were initially hesitant about online participation in discussion forums.

Some students have major issues with technology; they are afraid of the computer and such things. (Prof. 014)

Professor 023 noted that, although older students are sometimes intimidated by the technology, a strong trend is nevertheless emerging toward a demand for more online courses from some students. As Professor 034 explained:

A group of students came to see me and they thought it was terrible that they lived in St. John's [where the university is located] and they had to do an online course. [They thought] it would be hopeless, it would be awful, and they would really miss not being in the classroom. . . . They told me, after, that it was much better than they thought it would be and that they quite enjoyed it. I think some really like the flexibility that they can do their module and their course discussion anytime during the week. (Prof. 034)

Online students require technology and technology related skills to learn online.

Professor 033 noted that the first time she taught online she made the assumption that students had the proper equipment and were able to access the course easily. This was not the case and she found that the second time she was much more aware of what student problems might be and therefore tried to address them at the beginning of the course.

Professor 012 pointed out that students in her course demonstrated a range of skill levels:

You had students who had done a number of these courses and were up on the situation, and there were a couple of people who thought I was going to come through their monitor and teach it in their living room. There was one poor woman who never did ever get on the site properly; she just gave up in despair afterwards. (Prof. 012)

Professor 008 noted that in recent years the younger students are more familiar with WebCT because it has "crept down into the school system." Also, students know how to

install software and many of them have their own Web pages. Another professor (Prof. 015) mentioned that students often had trouble getting started in an online course but noted that this problem is becoming less common as the courseware gets easier to use and students generally have better computer skills.

Some professors noted that they were getting mixed responses from students about their feelings of online courses. Students liked some things about online courses but did not like others. Also, certain individuals enjoyed learning online while others did not. As Professor 019 stated:

The feedback I have gotten is fairly mixed to positive. I haven't had any students really enthusiastic about it in the way that I have sometimes had students in a classroom course tell me, 'That was great I loved that course.' But I do have a lot of people do multiple courses, so I judge that to be a positive sign. (Prof. 019)

Professors perceived that there were a number of aspects of online courses that students liked, including the flexibility and not having to "go outside in the middle of a snowstorm to take class" (Prof. 019). As well, there were several factors professors perceived were negative aspects of online courses for students: the lack of personal interaction that goes on in the classroom, "having to work at it so hard" (Prof. 021), and the time it takes to type a posting.

A few professors expressed that they received less feedback from students in online courses. Professor 022 commented on this lack of feedback:

The difference between online and classroom offerings is, it seems, that in an online course you get very little feedback. Last semester I had 26 students; they

were sent sheets to comment on that and I got back a third or something like that.

(Prof. 022)

Professor 023 proposed that how students view online courses depends on the individual courses they have taken. Some of the courses available online are perceived by students as being of low quality and Professor 023 had heard students say the online courses from another university were “a joke.” Professor 024 noted that there seems to be two groups of students: those who are comfortable using technology and those who are not. She indicated that students who are familiar with using the technology are often strong advocates for online courses, while other students who do not have this experience or adequate equipment become really frustrated. Another professor (Prof. 031) agreed that personal preference plays an important role in students’ perceptions of online courses. He said that he would not want to take a correspondence course if he were a student because it is the “most boring thing he can imagine.”

Again, while students were not interviewed for this research, professors’ perceptions of them indicate that they are a diverse group regarding their views of online courses.

Interaction of Political Factors and Nonhuman Actors

The findings of this study indicate ways in which political factors and nonhuman actors exhibited themselves in the context of professors’ adoption of online courses at Memorial University of Newfoundland. First, findings pertaining to the physical geography and climate will be presented. Then, other adoption factors that concern political aspects of online courses will be described. Lastly, factors related to changing power structures will be highlighted.

Physical Geography and Climate

One nonhuman actor that clearly had an impact on the adoption of online courses was the physical geography and climate of Newfoundland and Labrador. These nonhuman actors interacted with human factors in several ways. For example, the climate and geography impacted settlement patterns and a political culture that resisted resettlement efforts followed. As a consequence, access to education became an issue. How these factors impact the adoption of online courses will be elaborated on in this section.

Early settlement patterns saw the establishment of many small communities around the vast and rugged coastline of the province to pursue the fishing industry. These patterns prompted a series of political pressures that resulted in the allocation of resources to provide alternatives to the traditional classroom mode of post-secondary education. The importance of such political pressures was evident in the comments of professors about the importance of government funding for initiatives related to distance education.

Professors emphasized the importance of accessibility to education for students in rural areas of the province. Many professors thought the main strength of online courses is the way they improve access for students. This view was based on the recognition of the physical challenges that make it extremely difficult for many potential students in the province to take courses through the traditional on-campus model. Instead, the online format allows students to participate from anywhere there is Internet access.

Through conversations with students in her summer and evening face-to-face courses, Professor 009 realized the hardships some students experienced getting to class.

Some students had left their families and moved to St. John's for the summer, while others were driving 300 or 400 kilometres to participate in courses. When she realized courses could be offered online in a much more convenient way for students, she set out to offer these courses online. Other professors also recognized student demand for online courses due to their scattered locations around the province and cited this as a factor that influenced their decision to adopt online courses. Indeed, students were putting pressure on the administration to increase the number of distance courses available. As one professor (Prof. 001) stated:

I am not a really big fan of technology. My preferred delivery mode for a course would be in the classroom, but with this course, where it is a required course and it is a course which so many people need to get an accounting designation program, it had to become more accessible. . . . I guess it was more the need of the students that prompted me to become involved. (Prof. 001)

Geography and population patterns also emerged as factors that led to programs being delivered online. Professor 004 explained how the program she taught in became available online to broaden accessibility to the program. The decision to offer the program online was initiated to expand the catchment area so there would be enough students to render the program viable. Indeed, several professors mentioned how expanding the geographic base of the university would help the university deal with the declining traditional student population base. Also, at this time, the university was moving toward online delivery. Professor 010 first became involved with online courses when his department put forth a proposal to obtain government funding to develop three courses. He had been aware of the existence of online courses and the concerns about the

viability of a strictly campus-based program. Furthermore, there were a number of students who had partly finished the program and would only be able to take the course if it were offered at a distance. Professor 018 had been involved with organizing distance education at the university and when there was an infusion of outside funds, it seemed like a natural progression for her to move online. An added incentive for some in administration, she speculated, was that the program she taught in had potential to be marketed internationally.

As will be discussed further in this chapter in relation to economic models, many professors were enthusiastic about offering online courses to an expanded geographic area. Some professors see this as a “marketing” opportunity and a for-profit venture, which the university should be pursuing. Other professors were concerned about the more competitive environment that might develop as a result other universities offering online courses to students from this province. Aside from the possible funds that might be generated by offering online courses, some professors thought other benefits might come to students. The variety of courses offered might increase because of the wider drawing area. As well students from other locations might bring more diversity to class and in some ways this would be beneficial to local students.

Often there was a collective decision to move courses online. A number of professors explained their decisions involved some kind of collective effort and, as professors, they had a certain level of input into the decision to move courses in a program online. Professor 004 explained when a program review was done a collective decision was made within the department to offer the program by distance. There were many students who had to travel to St. John’s who were finding it difficult to do so and

this interfered with them completing the program. By offering courses online, the university would be able to attract applicants from other parts of Canada and from around the world, adding to the overall viability of the program. Notwithstanding that it was a departmental decision rather than her choice she welcomed the opportunity to experiment with a new format. Professor 012 explained that the department he teaches in had made the decision they were going to offer some courses online and was looking for volunteers. When no one came forward, he was asked and agreed to do it.

Professor 018 pointed out that the university has a long and ongoing commitment to distance education. She was teaching courses in a faculty where it was expected that some courses be offered at a distance and teaching online is a natural progression of that expectation and commitment. A professor (Professor 020) in a different subject area explained that prior to her arrival a decision was made in the faculty to offer some of their programs by distance. This decision was arrived at after a group of professionals in the subject area made representation to the faculty. Professor 024 said most of the courses in the degree program she taught in were online because the degree was designed for students who wanted to continue their studies after completing a diploma. These students would be working in places all over the world and the best way to offer them the opportunity to continue their studies was through the online mode. She fully supported this approach and was “somewhat involved” in the decision to offer the courses in that manner.

For some professors, a combination of factors influenced their propensity to offer online courses. Professor 020 pointed out that a large grant from Industry Canada was important in making available to faculty the option of going online. The supportive

atmosphere in the faculty, as courses were being put online, also propelled her toward this mode of delivery. Professor 002 observed an expectation and culture within the faculty where he teaches that students be able to do courses this way if they choose to.

There is a culture, to a certain extent, of offering some kind of an online aspect. I suspect, if you checked, a large proportion of the classes have some kind of an online presence. So with the culture there, it becomes, if you don't adopt then you start looking like a Luddite. . . . Not so much peer pressure, it is student pressure. Students expect it. Business students expect to be able to access lecture notes. I don't think that is an unreasonable expectation. (Prof. 002)

A number of policy statements issued from the administration of the university supporting the use of technology in teaching and in particular distance education appears to have motivated Professor 035's engagement of this format. He noted the situation facing students is also changing and that students are placing more demands on the university system:

The whole university environment has changed over the past decade, but even in the past decade I'm finding that students have more and more demands on their time and many of them now are working part time and some of them are working a lot of hours part time. When I talk it over with students, they sort of point out the quandary they are in and that, yes, they would like to come to classes, but if they don't work they don't have money to pay for tuition. (Prof. 003)

For Professor 029 the decision to teach an online course evolved out of his interest in the subject area and in the new technology. He noted, however, that teaching online has its disincentives because of the way professors are paid for doing so. Professor

029 explained that if the course is taught as an extra course or “overload,” they are paid on a per student basis that does not correspond to the amount of time put into the course. This professor explained he teaches the course because there is a need but at the beginning he was not enthusiastic about it:

Well, I recognize the need so I do it. I think if they said to me, well, this needs to be done but the professor in the next office expressed an interest if you are not going to do it, I think I would have probably said OK, let him do it, but I realized it was either me or nobody, so I did it and I find it is beneficial to me to do it.

(Prof. 029)

As with other professors, he was aware of many cases where students have almost completed a degree and then move away. The only way they could finish, without disrupting their lives, would be if the university offered the course online. So, this problem was a key component in his decision-making, as well.

Accessibility for the professors was also a factor in the adoption of online courses. Some professors wanted to travel out of province and attend conferences and professional meetings within their field of study. Others were involved in research projects in remote areas of the province. Online courses helped them overcome problems associated with this because they could continue to teach online while they were traveling. In this way the availability of online courses helped them overcome the problems of physical distance.

Other Political Factors that Relate to the Adoption of Online Courses

The findings revealed that technologies bring with them certain political structures. The professors’ comments indicate the complexity of the situation, as competing pressures, such as demands for greater access to education and demands to

keep the format of online courses consistent with the in-class versions, exerted themselves on professors. Also, just as accessibility for students in rural areas is a political issue, so is accessibility for working students in areas where classroom courses are available.

Professor 001 noted the most important issue for her was that of access. She remarked that online courses gave students, who might otherwise not be able to take the course, the ability to do it. This applied not only to students who are in remote locations, but also to students who do not wish to be traveling during winter.

Professor 001 explained that some students prefer online courses because of the flexibility it adds to their schedule:

A lot of them really like the online thing because a lot of them like the option of staying at home or staying at the office and doing it—the convenience. There are a lot [of students] who really enjoy the classroom and I know a lot of people say to me I prefer to do it on campus but I can't do it this semester; I will have to do it online. (Prof. 001)

Professor 010 also noted that the convenience and flexibility is particularly appreciated by people in rural areas. These students reside in areas where they otherwise would not have been able to take a course:

But most of the people were enthusiastic about it because that was the only way they could get it. This was the only way they could get higher education. They are working, they have children, they are in a situation where they just can't pick up and go to a university town or even to visit one for the time it would take in face-to-face. (Prof. 010)

Professor 011 said that many of the students who came to his night classes in the past were tired after a day's work and by giving them the added flexibility it is making their life easier. Another professor (Prof. 009) made a similar point, stating that the main motivation for her was the fact that students had to make major disruptions to their lives to complete their programs. She says students were extremely frustrated with this and are appreciative when online courses can be offered.

The most desirable feature for many of his students in online courses, as one professor said, was the flexibility. He gave the following example of one of his students:

At that time, that was the only way he could have done the course because you know, his wife had just had a baby, she was not working and he was caught up in trying to buy a house—the whole nine yards of a young man trying to get started.

He would get home and, when the baby was asleep, if the place was quiet he could sit down and do his work. There was no other way he could have done it.

Convenience was a big thing, because there was no particular advantage otherwise. (Prof. 012)

He went on to explain that even students who are doing other courses on campus appreciate the flexibility because they often have very busy lives.

Professor 029 said his sense was most students would rather take courses in class if they had the option, but being able to take an online course allows them to do it sooner. He thought most students like having a class to go to because it forces them to keep up. Distance education is very much independent study and requires more self discipline than does in-class courses. He also stated that when you compare online courses to correspondence most students prefer the relatively rapid exchange of information that is

possible online. Another professor made a similar point about the importance of flexibility in students' schedules:

It [an online course] is available to everybody; they can access all the technology that we were providing. It is flexible in that they can pop in and do a little bit, go out and then come back in again. (Prof. 010)

While professors mention several advantages, many of them see access as “the biggest single positive factor” (Prof. 022). Two professors mentioned that they thought online courses might be the “hook” that brings new students into university. With the convenience of taking an online course, some students may begin their studies with this method and then decide to do other courses on campus. Another aspect, which professor 024 mentioned, was that students in online courses could do the course at their own pace.

Professor 033 also emphasized the access issue for certain potential students:

It allows the students who don't have access to the classroom here to be able to access the courses and be able to get on with it and do their degrees. It can be very useful for those students because our target population is working, often full-time, they have got families; they have got other lives. So being able to access the computer and the course at their own pace or at their own time, is of great benefit for them. (Prof. 033)

Three female professors noted that there were gender issues related to the adoption of online courses. Professor 027 explained that when she was a student she had taken an online course and found the improved accessibility to be very important to her at the time:

I am interested in women's issues; I have a degree in that area. I had two small children at home and I lived quite a distance from the university. So, from a students' perspective, and the perspective of a young mother, it was a wonderful opportunity to take a very challenging, very interesting course, meet some great people, work with an excellent professor, and be very flexible about my own time. You know, I could get the kids in bed and do that sort of thing and work as long as I wished. (Prof. 027)

Both this professor and Professor 007 noted that women tend to participate more in the online discussion than they would in class. She again used her own experience as a student to illustrate her point:

The . . . discussion by women in the course was beyond anything that I had experienced in a classroom as a student. Women tend to be quite quiet in class whereas on the listserv, which is what we had, we did a lot of talking. I know personally for myself I was always a very shy student in class but I wrote reams of stuff on the listserv. (Prof. 027)

Professor 007 noted that she has taught some students both online and face-to-face. She noticed a significant difference in the level of participation online and was surprised that students who do not speak in class often are very active participants in the online discussion.

A second gender-related issue that arose regarding the adoption of online courses was the "mystique" surrounding the technology and how hard it is to use. Professor 040 thought the emphasis on technology, and the way it is presented as something "grandiose," may push some people—particularly women—away from teaching an

online course. She suggested that, in order to prevent this from happening, professional development and support services have to focus on sending the right messages about making the technology transparent and easy to use.

Another issue that was brought up in relation to the political aspects of offering online courses related to maintaining a level of consistency between the different ways the courses are offered. This is a political issue in the sense that the government recognizes learning and accreditation are important functions performed in society by universities. Professor 001 explained that she tries to simulate online what she would normally do in class. In fact, she felt that keeping the course content consistent is vital:

My course is a prerequisite for the accounting designations. So, if I don't keep it consistent I am not really doing justice to the students who take it and to the bodies they eventually go on to become members of . . . I feel a professional obligation to do so. It is as simple as that. The course would not be any different in terms of content. (Prof. 001)

Conversely, Professor 022 explained that he had to change the content and approach of his course when he taught it online because of the difference in his students:

We structured the course a little differently; simply because after the first time I taught the course I realized that I was getting more of a mature student with both work experience and experience in business. [I] focused a little more on issues, rather than structured a situation for them. If you understand basic business concepts it is different than if you are in your first term or second term of business. (Prof. 022)

Both professors 023 and 031 thought that while the content should remain the same in online and face-to-face courses, it is difficult to maintain consistency in how the course is organized because it makes sense to teach the course using the resources that are available and adapt it to the characteristics of each format.

Just as the format in which a course is offered (i.e., online or face-to-face) may influence the content, delivery, and interactions that occur, the courseware or course management system used brings with it many political aspects. Some professors expressed problems concerning the way the courseware package, WebCT, worked. One professor (Prof. 008) was perturbed with the way the forum was organized because it does not allow for flexibility on the part of the professor. One major issue was the university's policy not to store discussion postings from one year to the next. Professors wanting to use previous forum presentations could not go back and access them because they were not saved. Also, this prevented professors from viewing work done in previous offerings of the course for comparison purposes. Professor 017 saw these kind of records as important because students often come back looking for references. Normally, he would refer to the information he had in his file cabinet, but since his online material had not been archived, it was not possible to do so.

Another issue identified with the courseware package was "feature creep." Feature creep refers to software that grows more complicated as successive versions are released. Another problem was the increasing cost of keeping up with new technology as it becomes available. The nature of this technology is that it is rapidly changing and it is problematic for the university, professors, and students to keep up with these expensive changes. As software packages become more complex, students and professors are often

required to upgrade computers to keep up with the changes. As professor 008 claimed: “It will be a long time before this way of doing education is as cheap as a piece of paper or a piece of chalk and a blackboard”. In some courses, students had to purchase special software to take the course at an additional cost to the student. Professor 008 suspected these additional costs may put “a brake” on the constant change occurring in the system. While some professors had problems with the constraints of the course management packages being used, none mentioned the possibility of using open source software as an alternative. This could be an indication of the lack of recognition among professors that the choices of course management packages do involve political issues.

Changing Power Structures

Yet another indication of the political changes happening as a result of the adoption of online courses relates to the way power structures within the university were shifting and the independence of the individual professor was being impacted. One professor (Prof. 034) thought the main disadvantage of online courses was that professors were somewhat dependent on other staff if they wanted to make changes to the course. Most professors do not have the technical skills needed to make changes to the courses they teach. Also, most courses were designed in advance and making changes can cause problems. Professor 034 noted that this disadvantage might disappear in future years as technology becomes more user-friendly and professors become more familiar with the technology. Professor 007 mentioned a similar concern, noting that in some situations technical problems are out of the control of professors.

Some professors thought DELT exerted too much control and interfered in their courses. One professor accused DELT of promoting a “factory model” of running

courses. He was also concerned that it was setting up dummy accounts in courses, which he referred to as “spyware.” Concerns about security and the integration of his personal files with those he has as a professor teaching an online course were also apparent for this professor:

Someone has to maintain these things, but who and how? The university is an open environment where people are allowed to do research on their own and are encouraged to teach the way they need to teach. That is mixed up with an integrated online environment—integrated in the sense that you have a graphical front end with some tools for discussion and so on and the back end is directly linked to your payroll, the students’ grades, health information, [and the] personal files that they maintain on every faculty member. It is not right; that is a big danger that is going to get worse I suspect. (Prof. 017)

In this section, findings have been presented that show the importance of political factors and nonhuman actors on the adoption of online courses. The findings reveal the ways these two components of society interact in the context of the adoption of online courses at Memorial University of Newfoundland. In this case, there was a combination of a sparsely populated huge geographic area, combined with political pressures to create a situation where successive governments have funded the offering of educational opportunities through various forms of distance education. Professors indicated how important serving the needs of these distance education students was to their adoption of online courses. Accessibility was not only an issue for students living in rural areas but also for many students living near campus who had work, family, or other commitments that made it difficult for them to attend classroom courses. There were also indications

that political changes were happening at the university as power structures were changing and the previously independent role of the professor was evolving to become more team oriented.

Technical Momentum and Existing Technology

Technical momentum refers to the “inertia of motion” large technological systems develop “as organizations and people committed by various interests to the system” support the continuation of the system and work to prevent change (Hughes, 1989, p. 76-77). Findings from this research illustrate how the dominant existing technology for offering educational opportunities—the classroom—has a momentum within society that impacts the adoption of online courses. Two themes relating to technological momentum and existing technology emerged in this research and will be presented in this section. First, in exploring professors’ views on the future of university teaching, it was noted that their perceptions were based on mindsets founded on previous technologies. Second, professors’ views on assessment were sometimes formed based on the affordances of a previous technology and did not take into account the difference in an online context than in a classroom environment.

The Future of University Teaching

Professors’ views on the future of university teaching provide insight into the concept of technological momentum and the connections people have with previously existing technology. The perceptions professors have related to the future of university teaching are significant because not only are these people well informed about what is happening, but they will also most likely be active participants in the decision making process related to future developments. While they believed more courses would be

available online in the future, many professors did not want to teach all their courses in this medium. Professors anticipated further changes in technology, program offerings, and the very structure of universities. The views of professors and the predictions they make about the future of university teaching are much more restrained in comparison to those being made by the developers of the technology such as Kurzweil (2000). This indicates that professors may be in a unique position to understand how societal factors sometimes determine the rate of adoption of a technology.

As professor 001 explained, “Everything seems to be moving towards the Web”. She surmised that this was happening because students have trouble getting into the courses they need on campus because of limited space. Offering courses online makes them more accessible. She expressed the belief that, in the future, many courses in masters’ programs would be offered online. Indeed, many of the professors interviewed thought the number of online courses would continue to increase; one professor made the observation that senior administration “seem to be putting a big effort into the distance courses and online courses” (Prof. 007). Yet, while professors believed online courses would continue to increase in number, many felt that classroom teaching would not disappear because it is so “anchored in society.” Professor 009 indicated a number of factors—not just improvements in technology—are encouraging the adoption of online courses. For example, declining enrolment in some areas and financial constraint are also factors.

Another professor (Prof. 011) said that better technology, both hardware and software, would also facilitate the adoption of online courses. He made the point that

there will always be some classroom teachers, but they will continue to diminish as the current trend continues:

How many courses are actually taught in the evening and how many of these have gone online? As technology becomes more evident, then more kids come out of the digitized environment. You have [then] got more kids that will be easier to integrate into an online course. (Prof. 011)

Professor 011 contended that the only thing that could hold this back is the university's inability to respond to change quickly enough.

Many professors expressed views about the fast pace of technology development. They commented that, as professors are provided with more training, the full potential of the advanced technology would become more evident. Professor 012 said there is the potential for a broader use of new technology. Professor 017 expected there will be more online courses and more delivery options based on student access to improved technology in the future. As technology continues to develop, Professor 021 believes, more training should be offered for professors to better prepare them for online teaching.

Some, however, conveyed that there was a limit to how many of the university's courses would move to the online format. Professor 023 indicated he would not like to see it go beyond 40% of what is required for a program. For him, the interactions that happen in a classroom are "essentially" part of the "pedagogical relationship." While recognizing online courses can augment traditional learning in many ways, Professor 023 was leery of offering whole programs this way. Professor 024 did not think online courses would replace classroom courses in the near future but predicted that, within 10 years, technology would have improved to the point where universities will have to re-

evaluate what they do. Nonetheless, this professor indicated that because of their content, some of the courses would still need to be delivered in the traditional classroom venue, but advances in technology might change what is possible:

I can't see our courses, with a heavy design component, totally online. The amount of time which is spent with the students individually to discuss their work and to give them some guidelines and so on, they need face-to-face. . . . Maybe if the nature of online courses changes dramatically, maybe one of these days, but for the time being I can't see this happening. (Prof 024)

Another professor (Prof. 027) was concerned that with too many courses online students might miss some of the spontaneous interactions and informal intellectual exchange that happens in a classroom. One professor said that while she recognizes technology is "shaping and fashioning social interaction," she still believes there is a real need for face-to-face interaction. Others feared putting more courses online might be done in a way that would have a negative impact on the quality of university education:

I see a push to do more. I don't mean arm twisting to go along, but I think there is a push to do it for the wrong reasons. People could see it as . . . administration, the bean counters, trying to save money—people trying to get the best bang for the buck and turning it into a factory, which is too bad. There is a place for different modalities and other ways for university instruction. (Prof 040)

Professor 031 indicated that while he thought more online courses would be offered in the future he did not see the disappearance of the university. While recognizing the need for online courses, many professors said they would not want to teach all their courses that way. Most thought that classroom courses will exist for the foreseeable future, but

the traditional correspondence course may disappear. One professor (Prof. 001) hoped the trend towards online courses would not move to the point where all courses are offered online. Although she acknowledged that online courses have their purpose, her first choice for teaching is the traditional classroom model. One concern with the adoption of more online courses was that it might create a tendency toward hiring more sessional teachers than full-time professors.

Professor 002 thought some courses are better suited to online delivery than other courses. He believes that as more courses are taught online, a “balance” will occur between what is appropriate for online courses and what should be taught in the classroom. For him, the level of the course is also a key factor in determining if it should be taught online or not:

I would not want to teach university courses online to first-year university students. I don't think at that point they have got their feet wet enough. They don't understand the ins and the outs and there are too many things going on in their lives. [Online courses] are much better suited for older students who can be self-reliant and responsible. (Prof. 002)

Conversely, other professors say introductory level courses will be the first to go online. These diverging views on what courses should be offered online demonstrates that no clear consensus on these, and many other issues like them, exists.

While professor 014 could see more courses going online and having online components, she thought there was a limit to the number of courses that could go online. For example, she indicated that some subjects require students to be in physical contact with components of the course, and you cannot do that on the computer yet. Another

professor (Prof. 018) noted that while he expects there will always be buildings, teaching styles will continue to change. She explained universities fulfil many roles other than just being a way of delivering content:

People still need to come together. A university is not just for teaching. It is one very important component of it, but a university is also about research, it is also about experiences. There is a lot to be said for walking the hallowed halls and having your discussions over a cup of coffee and that kind of stuff. (Prof. 018)

Although she too expects the number of online courses to increase, Professor 007 would not want them to replace classroom courses completely. She explained why she thinks such a drastic change would be “really sad”:

I think the classroom is a pleasant experience—a group of individuals who are all there for the same purpose. If you do enough quality teaching, group facilitation and group interaction is really valuable. (Prof. 007)

Some professors predict that the way courses are being taught will change because of the use of new technology:

I think we will probably see more online content for classroom delivered courses, so [there will be] a little bit of a blurring of the distinction between online and classroom delivered courses. I can see a world in which it is possible to take the course online, but you could also have the classroom participation if you wanted it. (Prof. 002)

Professor 014 believed that as professors become aware of what can be done online and grow more familiar with the format, the number of courses with an online component will increase. Another professor (Prof. 028) explained she would like to mix both online

and in-class courses as she does not like the idea of students being able to do the whole program online. She suggested including residency requirements and certain courses in a seminar format to encourage interaction.

Professor 005 said he sees the number of online courses increasing because of the focus being placed on them by senior administration at the university. He also believed online courses will increase as younger faculty, with more accepting attitudes towards technology, take up positions at the university. Other professors noted that not only will there be more online courses but also the use of new technology such as cellphones or other devices in education. One professor (Prof. 008) thought expectations and attitudes will change as more students who are comfortable with technology enter the system:

These kids who have grown up with [technology] may find it more comfortable to do it with a computer screen. Certainly books are dying away; generally kids get their entertainment today not by reading but from a computer screen. (Prof. 008)

Technology, he explained, will allow teachers to present material that they could never have presented in the classroom with just a blackboard. For example, he said, "You can draw three dimensional graphics on computers you could never draw on the blackboard". Another professor (Prof. 022) thought it would not be very long before video conferencing with individual students and with whole classes would become common.

Professor 012 stated that the resources available to students now mean they have easy access to almost everything, and this will only become more the case in the future:

In teaching certain subjects, teaching things like geography and teaching world politics and things like that, the potential for this stuff is mind boggling. . . . You have sites on Thomas Hardy, for instance, where you can look at the countryside

of the West of England, where Hardy based all of his novels, and that sort of thing. The ease of access is what makes the difference. Those photographs are all available in books as well but it is much easier to sit down and put your feet up and click your way through it than it is to . . . go to the library. (Prof. 012)

Professor 010 suggested the nature of what a university is will change in the future. Many potential students will not want to sit in a classroom or live in a residence. He contended that the university as a place where people come together for discussion and interaction will be transformed into a virtual campus. He also predicted there will be fewer campuses and students will focus on “a few key big name universities,” although he expressed uncertainty as to how this would impact how students learn. He suggested there might be local group discussions or partnership arrangements with smaller local universities to provide supplementary or field work arrangements for students.

Professor 031 envisioned greater variety for students in the way courses are offered. He saw this trend developing as on-campus students enrolled in more online courses. He further felt administration will encourage the trend toward online courses in order to avoid overcrowding on-campus courses. This approach will require the development of new infrastructure such as a 24-hour a day, 7 days a week, help desk for online students. He saw some significant challenges for universities as they prepare to better service this group of students doing online courses.

Professor 010 believed there will be increased competition internationally among universities:

I don't think universities have really tuned into how big a change this actually is in the way operations are going to be. The way things are going . . . students will be able to pick and choose from courses all over the world. (Prof. 010)

Similarly, Professor 009 thought universities would be in a more competitive environment in the future. In order to keep existing students and attract new ones, they would have to offer distance learning opportunities. Professor 015 thought persons from other provinces would start taking advantage of the online masters' program in her field in the future. She also expected more international connections would be made as well.

Professor 029 expressed that there would be pressure on universities to reduce costs and this might lead to more of an "assembly line" approach that would not be good for education. He predicted that as the number of people in society who want to attend university increases, there will be increased cost pressures and therefore pressures to change the delivery method.

Another expectation professors had for the future of university teaching was that there would be more marketing of online programs. Professor 004 thought there would be an attempt by the university to develop niche programs. Rather than solving the problems that stem from having a large undergraduate class, it would offer a solution to the problem of providing specialized education to dispersed groups.

Several professors also mentioned that new ways of organizing learning might become possible. Professor 010 stated that students may be able to work together or on their own using a combination of approaches such as virtual and face-to-face meetings. He was unsure what other combinations or possibilities might exist but believed universities would be very different in the future. Professor 017 predicted more modular

type programs where students will be able to mix and match small units of a larger program. He thought professional groups will start to deliver training programs online and people will move to home schooling with universities providing an accreditation function. He also thought informal groups and settings will be established to bring students together for the social aspects of university. Relationships, friendships, and networks will be set up in these groups the way they are now in sorority houses and university clubs, and these sorts of groups will be important in dealing with feelings of isolation that students might otherwise get from doing online courses.

Professor 041 proposed that the Internet will change education in a way television never could. He noted that in the early days of television many predicted it would replace classroom teaching. Whereas television is a relatively inflexible delivery method, online courses are more interactive and responsive to student input. Based on this, Professor 041 anticipates that there will be a move toward more “open learning” structures at universities. Despite this trend, he does not see online courses replacing the teaching classroom in the future. In fact, he thought this would be undesirable at the graduate level. However, he expects online courses will replace traditional correspondence courses and there will be a rise in non-classroom courses.

Professor 020 explained that she expects there will be more people making career changes in the future and this will drive the demand for new ways to organize learning:

People who are looking at career changes but can't leave their jobs are going to have to learn in different ways to make those transition points. I think that is where the future is going to be. . . . Look at the group right now that are heading into their 40s and early 50s; people don't stay in the same jobs all their lives; they

move around. . . . We are not only dealing with kids right out of high school anymore and it is not always first career people. So, I think we have to be much more creative. (Prof. 020)

Professor 020 envisioned programs will be offered in such a way as to allow people the flexibility they need when switching careers. For instance, people will do theory courses online and the university will work in conjunction with other groups to provide training of practical skills. She suggested that this could be a niche area where MUN might be able to respond to a demand because of the experience the university has with developing distance programs.

Professor 019 talked about the huge variance in views about online courses. Some individuals are overly optimistic and others are overly skeptical. He stressed that such extreme views are common with the arrival of many new technologies. For example, a similar response was triggered with the advent of radio and television. Professor 033 expressed doubt as to whether universities will ever move fully away from classroom teaching, but she believes there is a need to inquire into novel approaches and to test new ideas. She suggested exploring options for bringing people together in ways other than a classroom setting, as well as considering what kinds of students and subjects are best suited for online delivery.

The professors' views on the future of teaching demonstrate how they see a gradual metamorphosis underway, rather than the more radical departures that some individuals involved with the development of information and communication technology are predicting. Professors' opinions on the future of university teaching may

be more restrained based on their better understanding of how societal and technical factors interact to determine what change occurs.

Student Assessment

Another area where changing educational technology is constrained by societal factors is in the function of assessing student learning. In this instance, as well, the momentum of the previous classroom technology is evident. Findings related to how student assessment changes when courses are moved online will now be presented. One of the points where educational practice directly meets societal factors is when a student leaves an institution to enter the “real world” and has to present their education credentials. One major function in any course is assessment. Professors expressed their views on the many changes happening in assessment as courses go online. Four themes emerged: grading participation; controlling plagiarism; altering evaluation methods; and providing feedback online. Each of these sub-themes will be examined in the following sub-sections. These issues relate to how universities assess students’ learning in a way that will be accepted by a broader society.

Professors described how assessment was different in online courses compared with face-to-face courses. This caused concern because some professors saw a need for consistency between the two formats. Rather than give a final exam, as she does in her face-to-face course, Professor 001 asked students to write a term paper in the online course. As there tended to be only a small number of students in her course, marking these papers was manageable. She found it problematic to give an examination online as invigilation centres have to be set up where students can take tests in a monitored environment. These centres need to be set up around the province and, in some cases,

outside the province. One difficulty with this approach is that it takes time for the professors to receive the exams and the cost of doing invigilated exams is significant. In addition, another professor (Prof. 023) expressed concern about the quality of the invigilation in small communities:

I have wondered about the quality of the invigilator and who is running these exams . . . I know the reality in [some communities]; a friend is the invigilator, the region is so small. Whether or not the invigilation will be rigid in the testing, whether or not they let them use their book, whether or not they extend the time—I have no control over that. (Prof. 023)

One professor (Prof. 014) explained she is moving toward having invigilated online exams, which she feels “is a big leap of faith for a lot of people.” The invigilated online exam allows for security of the material and also enables the professor to quickly receive the exam once it has been done.

Professors outlined various methods of assessment that can be used in online courses, such as multiple-choice tests, assignments, mini-assignments, reports, participation, learning logs, peer assessment, and special projects. Some professors changed from using essay questions to multiple-choice questions in their assessments because they are easier to administer at a distance over the computer. One professor (Prof. 008) explained that because sending math equations over e-mail poses challenges, he had considered switching his exams and assignments to a multiple-choice format. Yet, he decided against this since part of the assessment process in his subject area is seeing how students go about solving problems, as well as determining if they can arrive at the correct answer.

Professor 043 found that, since there is not the same free-flowing exchange of information online as there is in face-to-face meetings, it is hard for professors to work with students on individualized projects.

One method of online assessment that seems to be increasing in popularity is peer assessment. Professor 004 mentioned she has students prepare mini papers that are posted online for other students to look at and comment on. Although it is not “peer marking,” there is an opportunity for “peer response.” Similarly, Professor 009 explained how he handles online peer assessment:

I don't use peer evaluation, but students may [discuss assignments] in discussion forums. They are encouraged to discuss the ideas contained in the assignments of others because they get to read everyone else's assignment. (Prof. 009)

Likewise, another professor (Prof. 011) stated that student assignments for his course are posted where they can be viewed and commented upon by other students.

One professor (Prof. 017) described how he was experimenting with peer assessment and referred to it as the “democratization of assessment.” While peer assessment has been a part of the educational system for years, the online format can be used to facilitate the process and make it much easier, he explained. Students can upload their assignments for other students to look at and mark. Also, the process of peer assessment may vary. For example, it can be a double-blind study, where the marker does not know whose work they are marking and the student does not know who assessed their work. In this way, students receive the benefit of having a variety of other people comment on their work. This professor has also used “peer input” to provide students with formative assessment on projects for the course he teaches.

Some professors described how they were engaging innovative assessment methods in their online courses. Professor 003 elaborated on one such innovation, whereby he has students create an “imagery script” that involves them explaining their best performance in a particular activity or sport. Before recording their own “imagery script” they have an opportunity to listen to the best examples from previous years online. Another professor (Prof. 006) had students do an “Internet learning log.” In this activity, students had to find and evaluate Web sites pertaining to topics in the course. Students were also asked to complete a case study where they applied the diagnostic skills they had learned in the course and recommended specific action. Another professor (Prof. 015) required her students to keep a journal of the course activities they did in their community. The journals tended to include personal reactions to situations and were kept confidential between the professor and the student. Sometimes students shared part of their experience with the class when they presented a case study for the course. In addition, this professor also used a “local supervisor” who helped the students:

They put them in touch with people who are experienced and work with them once or twice, supervise their teaching projects, give them guidance, evaluate them according to a form we have, and call us if there are any problems. (Prof. 015)

Another example of how professors had considered changing methods of student assessment was evident in their discussions of assigning a grade for participation in the discussion forum. Professor 021 said that when she taught a course in-class, she gave 10% for participation but in the online format she increased this to 20%, explaining that [for online classes] she expects “a different level of discussion from [the students].” In

the discussion forum in the courseware no standard of practice had been established for grading participation. Some professors allocated grades for participation, while others did not. In cases where marks were allotted, the percent of the total course grade varied greatly. One professor (Prof. 001) stated that the first time she taught an online course she did not assign marks for participation in the forum, but in future courses she would in order to encourage participation. Professor 002 revealed that he had a very structured way of assigning grades for participation in discussion forums:

I give about 10 percent of the final grade for participation in the discussion forum.

To a certain extent that is based on volume, although I try to tailor it Part of the mark is for being the first in discussing a question and part of it is for subsequent discussion and keeping the discussion going and that sort of thing.

(Prof. 002)

Other professors said that they used the features of WebCT to enable them to compile information about each student's participation in the course. Referring to these records helped professors determine the participation grade for each student.

Professor 040 noted that a grade for participation in online courses can be assigned in a more objective way than in classroom courses:

You can actually mark the participation in a more clean way online than you can in class; because, after all, if you are just talking about participation in a class session beyond showing up and attending it is a fairly subjective judgment. (Prof. 040)

For one professor (Prof. 006), the mark for participating in the discussion forum initially began as a small allocation of the final grade but now accounts for a significant portion

(40%) of the grade. Since he taught more than one online course, this professor checked the discussion forum several times a day so students received almost immediate feedback. One professor (Prof. 023) required students to do postings to the class forum at regular intervals as part of the assessment for the course. He explained that having this structure built into the course has been very helpful as it forces students to “stay on top of the readings and [means] they were all at an even point in their readings.”

Keeping assessment consistent for both classroom and online versions of the same course was a concern for many professors. Professor 005 indicated that students’ expectations of online course requirements are lower than for in-class courses. He believed students saw online courses as being second best and therefore they expected the professor to make the course or the assessment easier. This professor continued to use an invigilated midterm and final exam as a means of assessment, the same as he would do in a classroom course. Professor 029, who also wanted to ensure consistent assessment, administered the same examination in his distance course as in his in-class course. For another professor (Prof. 023), the assessment was adjusted in some ways to account for the locations of the students:

I try to keep [the courses] consistent around content, what I am evaluating, [but] I don’t think they should be . . . identical; I don’t think it is possible to have them identical. . . . You can’t do that online. Your students just don’t have access [to the same resources as on campus students]. Although the library says they do, they don’t have access. So I do a mentor assignment, which would not work on campus. (Prof. 023)

The comments made by professors afford evidence that the issue of whether to maintain consistent evaluation methods between online and classroom courses is a contentious one. Some professors claim that consistency is essential while others regard it as too restrictive and hampering the development of new options that may be more effective for online students.

Some professors contended that plagiarism is more of a concern in online courses than face-to-face courses. To counter this problem, Professor 011 used an open-book exam and designed it in such a way to make it difficult for students to plagiarize. Students are asked to answer questions using their own experiences, so it would be difficult for someone else to answer the questions for them. He also used a software package that allows him to scan material and find cases of plagiarism. He suggested that plagiarism is a serious problem at the university, yet it is not being dealt with:

Talk to any student who has been through a business faculty and talk to them about online courses and how they did their last term paper. Don't talk to them as a professor, but chat to a couple of 19 or 29 year olds [and] you will get to see what plagiarism online is all about. (Prof. 011)

This participant felt this was a very serious issue, particularly in professions where public safety is at stake. He suggested that in the near future testing agencies may become more common as an independent way of verifying a person's skills or knowledge in an area.

According to professor 040, in the early days of offering online courses there were a few problems adjusting to receiving assignments from students and sending materials back, but they seemed to have worked themselves out. He explained he tried to mark papers online but "that proved to be extremely cumbersome." Instead, the professor

prepared a general commentary on the assignments once he had corrected them. These comments would be similar to those a professor would make as assignments are handed back in class. Marking online, he concluded, takes too much time:

[It is a] time issue. If I were to actually mark online, or mark and then send back by e-mail, that is more time. . . . I think it is a matter of the more formalized way you have to approach writing. When you are writing that way, you scrawl comments in the margins of a paper and hand it back to the student. The scrawled comment in the margin has no counterpart when you are trying to do it on computer. (Prof. 041)

Several professors mentioned they received assignments and sent feedback by e-mail. One (Prof. 003) said he has a student assistant who highlights comments by putting them in bold or italics before sending the file back to the student. Another (Prof. 009) explained she taught a graduate course with 26 students and found there were too many students, as she “spent a lot of time” providing feedback on assignments. Professor 012 said he would highlight problem areas, make comments in the text electronically, and then send these essays and his comments back to students. He found that process worked “fairly well.” One professor (Prof. 014) received papers as either e-mail attachments or hard copies. She found that online papers typically take longer to grade than hard copies:

If it is not a good paper and I have to make a lot of corrections on it, then that can take more time because I’m trying to change the font or something to make it stand out to the student. I just graded papers on the weekend and three of my online papers took me twice as long as a hard copy would have. I did have it in a hard copy but I want to give the feedback directly to the student. (Prof. 014)

Some professors used weekly multiple-choice quizzes, which could be automatically scored by the courseware, as a way of monitoring student progress and supplying rapid feedback. One professor (Prof. 031) said that he made these quizzes worth 10% of the final grade in a first-year introductory course. This helped ensure students were keeping up in the course.

Some professors, while finding e-mail to be a convenient way to receive material, found it easier to return hard copies. Professor 021 said she did not give any feedback electronically. If anyone sent her a paper as an e-mail attachment, she would print it and send it back as a hard copy. Another professor (Prof. 007) explained that most students send their take-home exams and research papers to her by e-mail. She does not make her comments on the electronic copy, however, because she finds “it too physically difficult” given the number of students and the length of the papers:

We are talking 48 ten-page research assignments. I would be sitting in front of that computer all day long. I find now that my back and my arm and my hands are all (she indicates pain through body language and facial expression). I’m getting a few related injuries already (laughing), so the two hours a day I spend in front of the computer is plenty. I don’t want to spend an hour minimum per assignment for a research paper. (Prof. 007)

However, when grading proposals, she does send an e-mail response because students need a quick reply so they can proceed with their research.

Professor 011 has students post their assignments in a location where the entire class could view them. He said he also sometimes posts his responses where all his students are able to access them as well:

If the class can benefit from the comment I'm going to make, I post it. If it is very specific to the student and I don't want other students to see it, then I e-mail it to them. (Prof. 011)

Rather than send back individual assignments, Professor 024 explained, she instead posts the solutions to the problems she has posed in the assignments. If a number of students make the same mistakes, she will comment on that, or if she wants to draw attention to something, she will make special note of that in her comments to the whole class.

Another professor (Prof. 028) described her approach of returning assignments by postal mail and writing an overall response on the discussion forum in the course. As many other professors indicated, she also preferred to print assignments rather than read them on the screen. Professor 015, in particular, found it very cumbersome to grade papers online and explained the process in this way:

I can't read papers on the screen and mark them; I find it very difficult, vision and so on. So I just print them off, mark them, and send them back. . . . I find reading the screen for a long period of time really bothers me. It certainly speeds up the process [by grading online] because by the time people send you things in the mail, that can take a week. . . . [Once I graded their assignment,] I would post their marks and they could access their own grades through part of WebCT, so they could get their mark immediately. (Prof. 015)

Professor 018 also said that although she received assignments both by mail and e-mail she returned them to students as a hard copy. She found it easier to give the extensive feedback she felt is necessary in an online course on a hard copy. Professor 019 explained he accepted term papers by e-mail, but noted they receive different levels of attention

from the ones he receives as hard copies. If material is sent to him on paper, he makes editorial corrections and suggestions. If course-related items arrive via e-mail, he does not do this. He explains why he is unable to give electronic copies the same level of feedback:

Just entirely coping with the workload; late papers only got a grade and papers e-mailed in to me only got a grade. If you wanted to get suggestions for how this could be a better essay or something like that, you had to print it on paper and send it to me. It was just too much work for me. I couldn't print it all out and there were formatting problems with electronic copies . . . I am just too busy at the end of the term. (Prof. 019)

Many professors reiterated the point that it takes more time to provide feedback on an electronic version of an assignment than on a hard copy. Professor 020 described her experience giving feedback online:

It took me probably two hours a paper because you have to highlight and you want to help them with their grammar, so in doing that you want to write notes, so you change colours so they can see it. You want to bend over backwards with them, so I found that was horrendously complex to do but they really appreciate it. (Prof. 020)

In contrast to the other professors' experiences, professor 023 tended to give more feedback on assignments in an online course, although he said it was "more work" for him:

I'm so afraid of losing the interpersonal connection with the students that I gave way more feedback online than I normally do. If I had assignments passed into

me, I would write notes in the margins and pass them back. Online I found myself giving more feedback, writing more. And then after each assignment I went in and I posted my reflection on the assignment, the things I looked for in the question. (Prof. 023)

Assessment is an important part of university courses. This section provides insight into how previous practice and the momentum of the previous technology can sometimes limit the acceptance of the use of features of a new technology. Issues that emerged included giving part of the final grade for participation, controlling plagiarism, altering evaluation methods, and the difficulty of giving feedback online.

The Economic Model

The economic model being used influences the adoption of a new technology. Professors identified both opportunities and problems arising from the foray into online teaching. Professors envisioned opportunities such as contract work and marketing programs overseas, as well as more experimentation with new educational environments. The findings presented in this section are significant as they reveal the way some professors are thinking about expanded opportunities arising from this new technology. Professors identified future potential from the perspectives of themselves as professors, students, and the university. Just as some professors were able to identify economic opportunities presented by the presence of online courses, so could they identify problems stemming from the economic factors relating to the use of online courses. Findings regarding both the economic opportunities inherent in the use of online courses, and the problems associated with it will now be put forth.

Economic Opportunities Presented by the Use of Online Courses

One way that the changing economic model used by universities was evident in the findings of this research was in the way professors talked about opportunities related to pursuing more contract work and attracting new students. One professor (Prof. 023) expressed that he realized “countless opportunities” for contract training and professional development that the university could be pursuing. He also thought the university should be pursuing niche courses or information sessions for groups that might be interested in that kind of learning. He offered the example of his vision of a program targeting parents of children who had learning disabilities as something that might work. Another underdeveloped area he foresaw emerging was in cross-disciplinary training where teachers, social workers, and medical professionals discuss issues from different perspectives. Professor 033 maintained there are numerous opportunities to develop courses and programs different from those currently being offered by the university. He suggested, as one possibility, workplace education in places such as hospitals or other professional environments. Professor 003 predicted that this new technology would leverage the university’s ability to service and attract new groups of students that in the past would have been unreachable. According to Professor 007, opening up access and allowing interaction is important in attracting new students. One professor (Prof. 012) suspected there is an untapped market for universities in serving people who would do a course if it were easily accessible:

In the case of some people—let’s say in early adulthood, [age] 24 or 25—who have never thought about going to university or getting a degree, the possibility of

checking the system out by doing a course [online] may be a hook. It may not, but I think there are all kinds of possibilities in that regard. (Prof. 012)

Several professors were of the opinion that opportunities for marketing online programs existed overseas. One professor (Prof. 014) described the potential as “huge” in terms of the university marketing its programs to students worldwide. Juxtaposed to this potential for a vastly increased market is the reality that the university has to keep up with the competition. Professor 031 noted that doing a program online may be more viable than students moving to Canada:

There is a lot to be said for students staying in their own countries and just getting the courses to them . . . For them to leave [their] country is a very expensive proposition, which means they are denied the opportunity in many respects. [With online courses] they can stay at home. (Prof. 031)

Professor 020 proposed that Memorial University market its distance education programs by partnering with other groups. Given the university’s experience with distance education, according to one professor (Prof. 034), a potential exists in the commercial delivery of programs. For instance, she saw a huge market for training in certain areas, such as nursing.

Some professors wondered how these opportunities for international marketing might impact them, as well as the students at the university. While one professor (Prof. 021) was aware of the many opportunities to market programs internationally, she was a little apprehensive as she saw no direct benefit to her from doing that. Other professors thought there might be some benefits for students in “opening” up the university. For example, a professor (Prof. 022) who described the opportunities provided by online

courses as “literally endless,” anticipated possibilities for professors with a particular expertise to teach courses to students from all over the globe. Indeed, several professors (Prof. 022) mentioned that drawing students from a wider geographic area would allow the university to offer courses and programs they would not be able to offer on campus due to the low interest within the immediate geographic area. It was proposed that the university could expand into specialized areas and offer a greater variety of courses for local students. One professor (Prof. 031) saw cost saving measures by cooperating with other universities in developing a broader range of online courses. In particular, he saw initiatives such as the Canadian Virtual University as having tremendous potential.

Teaching online courses has made several professors more likely to integrate technology into their in-class teaching. One professor (Prof. 002) explained that since he began teaching the online course, he has used some of the skills and software he became familiar with to enhance his in-class courses. Another professor (Prof. 007) considered developing some online components for her in-class course. She observed that her experience with the online course made it easier for her to increase the use of information and communication technology in her classroom teaching. Two other professors (Prof. 014 and Prof. 018) expressed the view that both teachers and administrators should be encouraged to use technology more in their in-class courses.

Economic Problems Presented by the Use of Online Courses

Not only did professors see opportunities associated with online courses, but they also described problems they have with the economic model involved. Some of the troublesome aspects that professors identified included a lack of planning going into the adoption of technology; the need for increased infrastructure to support online courses;

the unstable nature of the courseware; and the danger that online courses might become used primarily as a cost saving measure.

Professors felt that inadequate planning and preparation had been put into the adoption of online courses as the university had rushed in for economic reasons. One professor (Prof. 004) recommended that the “goals and purposes” of each course be examined before the decision is made to place it online. She worried that the course system was being set up as “a cookie-cutter thing and they are all the same.” Professor 009 was concerned the full potential of online courses would not be realized. She felt professors would underestimate the change that was possible and, because of that, limit the way they use online courses. Another professor (Prof. 011) supported this concern, saying there has not been any extensive discussion about the move to online courses:

Most of the profs don't even know what the issues are; they just know that, increasingly, they are being pushed . . . in this direction. . . . It is a lack of any intuitive kind of co-ordination and getting the professors to fully understand the latitude and the kinds of dimensional impact on our courses. It is not fully understood. (Prof. 011)

This participant was concerned that the university was not encouraging innovation and that it had settled into “treating courses like commodities” rather than “opening up new knowledge.”

Several professors commented about the need to improve the support infrastructure for online courses. One professor (Prof. 017) in particular had problems with the way the distribution of material for courses was being handled. Some students did not get their material on time. Furthermore, when things went wrong no one

individual was responsible for the whole course; one person was responsible for textbooks, another for videotapes, and another for registration. One professor (Prof. 024) noted that, at this point, the phone-in help desk is not always available for people taking online courses. Despite the fact the professors recognized the need for infrastructure to support online courses one professor (Prof. 008) was concerned about the cost of putting this in place. Equipment, such as computer labs with the up-to-date software and hardware, is expensive to maintain. This professor also noted that students now come to university with greater expectations about the availability and integration of technology.

The quality of online courses was another area of concern for some professors. Professor 029 mentioned that there is a potential problem with maintaining standards for courses transferred from other universities:

What is to stop a student from saying I will take the courses I want from

Memorial and some of the hard ones I will do somewhere else. . . . It kind of makes the whole world becomes one university now, you can mix and match from anywhere. (Prof. 029)

Another problem associated with the increased use of technology is that it is making plagiarism easier and it is becoming a problem in both classroom courses and online courses. According to Professor 033, this problem can be particularly difficult to detect with large online classes.

Several professors mentioned there was a natural limit to how many students one professor could teach effectively in an online format. One professor (Prof. 034) pointed out that problems could arise if online offerings ballooned, particularly if class sizes were too large for the professor to manage properly. Another professor (Prof. 033) also saw

class size as a concern. She too thought there could be a natural limit on how large a class should be, but sufficient evidence is not yet available as professors are still experimenting with class sizes. Concern was raised that online courses were being promoted as a cost-saving measure, which one professor (Prof. 012) deemed not acceptable. She feared it would “fall under the mantra” of doing more with less and bigger classes would thus be accepted as standard. Another professor (Prof. 022) also thought the university might focus more on online courses for economic reasons. He stated his bias against the technology and explained that he felt in-class courses were of a higher quality. However, this same professor said that if he were younger and had grown up with the new technology he might have a different view. Professor 017 noted that students are no longer constrained by location and MUN will have to be ready to compete with other universities around the world. This, in many ways, will lead to a customer-driven approach and a market-driven direction that could then also lead to problems.

To conclude, several themes emerged from the findings relating to the economic nature of online courses. For example, the use of online courses to increase the viability of a program by marketing it to a broader area and the dangers of allowing economic considerations to be the main factor when making decisions related to the adoption of online courses. There were also concerns that online courses could be used simply as a cost savings measure with little thought given to the impact on the quality of education received by students or professors’ job satisfaction. Professors also expressed concern about the cost of software required by students and the problem of maintaining the entire computer infrastructure at the university.

Summary

In this section, the societal factors that professors identified as impacting the adoption of online courses were summarized. Four themes emerged: perceptions of relevant social groups; the interaction of political factors and nonhuman actors; technical momentum of existing technology; and the economic model used. The socially constructed perceptions of online courses that professors held were evident in the findings in terms of their views on their advantages and disadvantages. While the accuracy of professors' perceptions may be disputed, they are significant since these professors act on the basis of these perceptions. Also, given the importance that other professors place on the views of those who have used the innovation in circumstances similar to their own, the perceptions of professors are critical for the future development and adoption.

The findings related to the advantages and disadvantages of online courses, in particular, outline many points relevant to how professors perceive the attributes of online courses. The major relative advantage of online courses seen by most professors, when compared with classroom courses, was the increased accessibility to courses for students who would not otherwise be able to participate. Other advantages of the teaching medium also emerged: the written record of what was said; the independent study skills it encouraged; the ease of linking to online resources; and the enhanced quality of the discussions that could take place in the discussion forum. Professors did see many practical benefits and, generally, their positive views were augmented with each online course they taught.

Many of the perceived disadvantages of online courses related to the lack of visual cues and the immediacy of the interactions. In class, professors stated the discussion was more free-flowing, a greater sense of “community” developed, and it was generally easier to communicate with students. The difficulty of supporting rapid interactions online seemed to be more of a hindrance in some courses than in others. For example, several professors who taught courses involving numbers, such as math or economics, experienced challenges because they could not work through problems on the board in the same way they could in class. One professor mentioned he had taught a real-time teleconference course where he had used a computer attachment to present material to students at various locations around the province. He found this to be more effective than the asynchronous online course he was currently teaching as it enhanced interactions with students.

In this research, no attempt was made to obtain information directly from students regarding their perceptions of online courses, nor was an attempt made to draw conclusions about the accuracy of the professors’ understandings of students’ views. How professors perceived the students’ impressions of online courses is noteworthy because many of the professors in this study indicated that the views and concerns of students were very important to them. Professors’ views are significant because professors act on the beliefs that they have about students’ views. They observed, for example, how students in online courses were different from those in face-to-face classes. They were of the opinion that students in online courses were older and more pragmatic. Further, they perceived students as busy individuals, often married, with full-time jobs, and more driven by the need to get credentials. Professors thought students saw online courses as

“second best” and expected some kind of a “break” from professors. It was generally felt by the participants of the study that students only took online courses because they were unable to take the face-to-face course.

This study reveals the interaction of political factors and nonhuman actors. The research provided herein makes it apparent that professors see accessibility and flexibility in scheduling as key factors for students. In places such as Newfoundland and Labrador, difficult geographic and climatic conditions, coupled with a dispersed population, make increased accessibility for students a crucial issue. Also, even in urban areas where the options of face-to-face courses were greater, accessibility was an issue for students who had work or family responsibilities. The kind of infrastructure the government chooses to invest in determines the options that are available to students facing certain physical or societal limitations.

Professors noted that some online students fear technology and do not want to take online courses; they only do so because they have no other option. However, once those students take a course online their views often change and they are less negative. Professors explained that in some cases students did not have the skills needed to take an online course. While some students were experts, others were complete novices. This observation by professors indicated that some students need additional support before they take online courses and universities should consider developing an understanding of how to best meet these needs. Another point professors made was about how little feedback they received from students and how little they knew about online students. More research on students’ views of online courses is warranted. As professors cannot obtain informal feedback in the same way as they would in classroom courses—for

example, through informal conversations—other mechanisms should be developed to gather such information.

Findings related to technical momentum and existing technology also emerged. As frontline participants and observers, professors are in a unique position to make predictions about the future of education. Many professors expected the number of online courses to increase, but they also cautioned that they would not want online teaching to become the only thing they do. In fact, a number of professors thought there should be a balance between online and in-class offerings of every course. Several professors expressed concerns about the number of courses online. Many of them pointed out that there is more to a university than just content delivery; aspects such as research and socialization for students are also relevant and should not be ignored. Some professors predicted that new forms of learning, such as hybrid courses and programs, would develop. Others thought new technology, such as cellphones, notepads, PDAs , and videoconferencing, would be increasingly used in education. Another commonly held belief was that increased access to information would change course content. For example, more pictures and videos will be used in teaching and greater choice in the way courses are offered would exist for students. Competition among universities would become more of a factor and the demographics of people going to university would change.

The findings show that the use of online courses is causing many professors to change the way assessment is conducted in the courses they teach. The new mode of teaching influences the ease with which various methods of assessment can be used. For example, invigilated tests are more difficult to conduct online, while peer assessment is

easier. According to some professors, other problems, such as plagiarism, may be more prevalent in online courses. Professors explained that it takes more time to send feedback on electronic versions of assignments or term papers and so many were still communicating their feedback with students on hard copy.

Some professors noted that there are still a lot of unknowns about online courses and more research is needed. With new technology contrasting views often arise—in particular, some individuals may be overly enthusiastic while others may express skepticism about the technology. The closeness of these professors to the situation provided them with insight not just into the technical possibilities but also the social aspects of the adoption process. Given this unique position, these professors offer valuable insight into what the future may hold for universities.

Insight into how economic factors were influencing the adoption of asynchronous online courses at Memorial University of Newfoundland was obtained through this research. Professors were aware of economic opportunities that might exist for the university in pursuing the use of this new technology. As well pointing out that online courses enhance the cost effectiveness and economic viability of the programs currently offered by the university, professors also mentioned opportunities in terms of new programs or contract training. In some instances they embraced these possibilities, while in other cases individual professors questioned how such an enterprising approach would impact faculty members and students.

Some concerns were articulated that the university was placing economic competitiveness ahead of ensuring the quality of courses and programs offered. In the rush to take advantage of an economic opportunity, it was expressed, the university was

not ensuring adequate supports existed or that adequate thought had been given to the design of courses. The fact that there were very few comments related to the possibility or importance of using open source software or course management packages may indicate a lack of awareness about issues surrounding the possible commercialization of education by large corporations.

In summary, the findings of this research provide insight into how societal factors impact the adoption of asynchronous online courses by university professors. In many instances, the way professors perceived this new technology was strongly influenced by the circumstances and values of the society in which they existed. The practical and theoretical implications of these findings and possible avenues for further research will be explored in the concluding chapter.

CHAPTER 5

INSTITUTIONAL LEVEL OF ANALYSIS

The purpose of this study was to determine how various factors impact the adoption of asynchronous online courses by university professors. In this chapter, the institutional factors that affected adoption will be presented. The professors interviewed indicated that institutional factors are not limited to the formal, deliberately structured supports that the university have in place to encourage the adoption of online courses. They also include variables less obviously related to the adoption of online courses, such as an innovative environment or informal communication channels that support the sharing of information within the institution. In this chapter, both the formal institutional supports for the adoption of online courses and the general institutional environment that encourages or discourages adoption will be examined. The findings demonstrate how DELT (the office of Distance Education and Learning Technologies) encouraged the adoption of online courses, as well as how Web designers, individual administrators, and early adopters played the role of change agents. Also, the findings document how features of an organization, such as communication channels, employment contracts, organizational innovativeness, and other features, can impact professors' adoption of online courses. The findings will be presented under the headings of the institutional elements in the conceptual framework: nature of the social system, communication channels, change agents, and institutional supports.

Nature of the Social System

The nature of the social system was an important factor in the change process for the participants in this study. Three themes relating to the social system emerged from the

data: experimentation and innovation, structural and organizational changes, and terms of employment.

Experimentation and Innovation

An examination of the literature revealed that universities are often resistant to change. In this section, the findings related to this assertion are presented. Professors attested to the importance of strategies that will lead to the establishment of semi-independent organizational units at universities that push innovation. They further indicated how they were currently experimenting with online courses or planning to be innovative with them.

Professors gave examples of how they were experimenting with online courses as they started to teach online. Some were undertaking only minor changes to their teaching approaches while others were being avant-garde. Professors revealed they were planning to be more creative with their online courses within the next couple of years. Professor 001 expressed her wish to improve the interaction she gets in the discussion forum. She also wanted to link her course to Web sites related to her subject area. Professor 004 was still experimenting with some of the new features of WebCT yet did not exclude the use of traditional ways to communicate with her graduate students. At times she suggested they met face-to-face, if it was possible, to discuss their papers. She has also made contact with student by telephone, when helpful. During this period of experimenting, professor 004 did not intend to change the basic structure of the course:

I used a chat room for the first time this year for the tutorials around the discussion of what their paper topic was going to be—not entirely satisfactory. It is very slow coming backwards and forward. I am also sort of experimenting with

more links to specific types of content— content that would be online as opposed to being part of the package. I also add new material each time. So, I am just looking to change certain segments next year but I don't plan to change the basic structure of the course that seems to be functioning quite well. (Prof. 004)

Professor 003 described how he incorporated an “imagery script” into his course. On his course Web page, he provided audio accounts of students completing a task in their field. He believed he is motivating students to do their best when he injects energy and creativity in developing the course. During the first year of teaching the course, professor 003's goal was to transfer what he had accomplished in the classroom online, but in the future he would like to achieve more. For example, he wants to incorporate videos of high-performance individuals talking about and demonstrating the strategies and techniques they used to achieve their best. He saw the online course as something still in the developmental stages and was motivated to improve the course:

My goal in this is I want to have one of the best courses. I mean, it is not that I am pulling out all the stops. I haven't found it particularly difficult to use technology, but when it is used in this fashion I want to be setting the standard. As well, I want students to know that if you get into my course it is not going to be this sterile environment. (Prof. 003)

After teaching the course, professor 003 reviewed the instructional layout and encouraged feedback from students on how he could make the course better.

Another professor (Prof. 006) said he was considering using videoconferencing for his courses, but has not done so yet because most of his students did not have the technical skills or the equipment required:

At times, you have to come down to the lowest common denominator, which I find frustrating because I would like to put things on like streaming video, but now what we are doing is a lot of my courses will come to you on a CD. (Prof. 006)

Several professors provided specific examples of how they had made significant changes in the courses they taught. Professor 021, for instance, was experimenting with co-offering an online course with a professor at another university. She had also incorporated animation into her course and was interested in videoconferencing and using video clips to present mini lectures. She indicated she was still “exploring the options” that were available to her and how they would benefit students. Professor 022 wanted to find a way to expand the kind of discussion that takes place in his online courses but was not quite certain how that could be done. He was “almost frightened” to think about having a real-time chat with more than 30 students, although he suspected there may be technical advances in the future that would make such chat sessions more feasible. One of the first professors (Prof. 031) at the university to teach online still saw many areas in which he would like to experiment. For example, he stated that he would like to research class size and ways of breaking a class down into sections to encourage more interaction. Likewise, he is also interested in exploring how students’ learning styles impact their success in online courses.

Some professors were using real-time chat, or experimenting with the use of it, in their online courses. Professor 007 included optional real-time chats in her course and changed the time each week so people who could not make it one week may be able to the following week. This professor also tried using different strategies in the chat rooms,

such as structured or unstructured sessions. This professor did not intend to make the real time chat sessions mandatory as it would be too difficult to establish a time when everyone could make it. Professor 007 talked to other professors using real time chat and exchanged information about what worked for them.

When Professor 011 started using real-time chats, he had trouble keeping his students focused because they would often end up discussing trivial things. Over time, he learned the importance of establishing objectives for these chat sessions at the beginning of the course. This professor never made his chats compulsory, but at the end of the chat sessions he transferred the log to the course bulletin board so everyone could view it. That way, topics raised in the chat could continue to be discussed in the discussion forum. Professor 017 also experimented with real-time chat. He explored ways that he and the students could leave the chat function open so when someone logs on they would know who was available.

While Professor 012 was not experimenting or innovating with online courses, his involvement with them changed how he approached his in-class courses. Since teaching the online course, he tended to use Web resources more for his classroom courses, noting there were many sites relevant to his subject area to which he could refer his students.

Peer evaluation was one area Professor 017 focused on in online courses:

They [students] use this post-and-vote system quite a lot, where the students post and can look at their colleagues' work in draft form and . . . see how their [work] compares [to that of the other students], and I can keep records of early posters and late posters. (Prof. 017)

This professor also examined a variety of software to determine the software that best facilitated document sharing; that which would allow students to videoconference with each other; and the kind that would let him and his students engage in synchronous white-boarding and application sharing. Professor 017 surmised that there are many courseware packages available that make WebCT look quite archaic. These findings provide insight into the gradual way in which people change with changing technology. The professors tended to get things running, and as their comfort level increased, they made further adjustments. Their comments also indicated the issues they considered as they thought about modifying their courses.

Just as it is important to comprehend the factors that motivate innovators, it is also critical to understand why some professors are not innovating. If we can appreciate what causes the resistance to innovate it allows us to gain insight into the operation of the social system at the university being studied. Indeed, many of the professors in this study were not experimenting with online courses. Lack of time appeared to be a prime deterrent. Professor 002 explained that while he would like to venture into greater experimentation with online courses, as a young professor starting his career he does not have the time to do so:

There are things I would like to do, certainly in terms of online assessment and things like that, [but] there is a huge time commitment to put something like that together. At this point, I have a research agenda I have to pursue and that has to take priority. (Prof. 002)

He went on to explain that online courses already require more time to develop than classroom courses.

Professor 019 was neither experimenting nor innovating at the time of the interview, but because of a WebCT training session he had recently attended he had become aware of a number of tools that he was not presently using. While he intended to take the next level of training on WebCT and explore how he could use these tools in his course, he indicated that during the upcoming semester he would not make any changes to his course. The professor explained that he is “very mercenary” about his approach and unless he is certain it will be really helpful in delivering the course content, he will not spend a lot of time learning it. He noted that if he needs help he calls the technical people at DELT.

The work situation of some professors did not encourage innovation. A sessional professor (Prof. 019) explained that he would like to be more involved in online courses but it would require considerable time commitment. Since he is hired on a contract, he does not undertake any long-term projects:

I don't know if I am going to be teaching here or not. . . . Every now and then, I am reminded that if I put a lot of effort into something it may be effort wasted because I may not ever teach that course again. It is kind of cynical, I know, but that is the reality of contractual employment. (Prof. 019)

Similarly, a professor nearing retirement (professor 011) noted that although he has led experimentation in the past, he would not be the one to spearhead innovations in the future due to his upcoming retirement.

Some professors said they were looking to others, such as the people at DELT, to bring forward innovations:

I haven't made any innovations . . . to the way it is set up. I have let the Continuing Education [recently renamed DELT] people . . . take the lead in terms of suggesting modifications and so on. They have made certain cursory changes to the way graphics are presented and so on, and sort of technical improvements but no major innovations in terms of pedagogical type innovations. (Prof. 005)

This dependence on others to bring forth innovations was evident in the comments of many other professors and has implications for the role of course designers.

Professor 001 explained that there is a need for guidance when it comes to trying new things:

I feel on some levels I am under-utilizing the resource but I kind of don't know what else to do at this point. I feel that I have a very heavy . . . content . . . course and I don't want to have the [students] spinning their wheels doing all this stuff online which distracts them from the core content. I would be interested to see if there are any creative things that we can be using the Web for, which we are not now. (Prof. 001)

The professor went on to explain that she was not fully utilizing the "wonderful resource" of online courses because she had not used it enough to fully understand it. While she was confident the students were getting the same core content as those in a classroom course, she wondered if there were new ways to push the course beyond that.

According to some professors, the nature of the courses they taught limited the amount of innovation possible. Professor 027 explained that she had not really been "experimenting" with technology, but she had found ways to "clean up" the Web site to enable students to find the material they needed. Most of the work involved improving

and updating the course content. Another professor (Prof. 029) was not planning to make any “radical” changes to the course and explained he “essentially [saw] this course as almost reaching a steady state.”

I’m not thinking about anything in terms of radical designs of the course because I have effectively now made the course the same as the on-campus. We don’t see any changes for the near future. We are currently having an undergraduate program review where we are going to be looking at what courses we should offer and what should be in them, and that review may come up with recommendations for changes. (Prof. 029)

Professor 018 attributed her lack of experimentation with this innovation to the constraints of the technology that was available to students:

The bandwidth is not there to do a lot of fancy stuff. You could put audio up but it is choppy, particularly if someone is on a dial-up modem or . . . on the coast of Labrador. . . . We could have the students do their presentations online, but the technology is not quite there yet. (Prof. 018)

In summary, professors gave various reasons for not continuing to be innovative. With the exception of being constrained by the technology available to students, all other reasons were related to the social system of the university. These factors included time constraints, the work situation, looking to other groups for innovation, and unwillingness to push beyond the classroom standard. Recognizing the significance of these factors provides avenues for further analysis.

A number of factors emerged that relate to the gradual nature of change, in terms of the way professors adjust the courses they teach. It became evident that as professors

grew more comfortable with the format of online courses they slowly made improvements to their course. One professor (Prof. 010) explained he would like to experiment with some new aspects of technology the next time he taught the courses. Ideally, he wanted to see students giving presentations online, whereby they could create work and then make it available to the rest of class, as well as use video and animation in his courses. One factor that restricted how far his experimentation went was the limited bandwidth with which some students were working. Professor 023 indicated he would be making some changes to his course; the next time, he noted, "it will be a different course." He is presently developing another course and says he is "becoming obsessed" with the design of the course, given the difficulty of the content. The following quotation from professor (Prof. 024) indicates the gradual approach to change that was common among many professors: "I take feedback from the students [and] I figure out that some things can be changed; this would be better, this would serve them better you know. During these three years, yes, I have made many changes" (Prof. 024). Professor 033 noted that, while she was not really "experimenting" or "innovating," she was evaluating what she had done. She felt that the second time around she would be more aware of potential problems and be prepared to solve them.

When asked about "experimentation" and "innovation," many professors said they were not doing much of that, but they were still "learning about technology" or becoming more "comfortable" with what they had used. For some professors, the first couple of online courses they offered involved accessing and coming to terms with the new mode of teaching. Following this period of "stabilizing," they then started to think about experimenting and innovating. Professor 034 used the word "learn" rather than

“experiment” to describe how she was using her experience to understand how she would teach each new course. While it was valuable for this professor to hear what someone else had gone through she insisted that you still have to learn for yourself when exposed to something new.

Some professors were concerned that there was not enough innovation and the full potential of the Internet may not be realized. Professor 011 expressed discord regarding the lack of experimentation and innovation at the university. He felt most professors do not fully understand the impact online courses can have on their teaching. Dialogue at the university about the implications of online courses was minimal, as professor 011 stated, and no group was pushing innovation. According to him, professors were not being encouraged to experiment and be innovative:

We are not actually encouraging professors to go out there and seek this stuff out. It is almost like you have developed a 1956 Buick right and you are in an industry where you have the only Buicks and you have no competition. There is no incentive to develop the '57 Buick, you can keep marketing the '56. There is no competition; there is nobody out there that is going to complain, and universities at this point are not really competing with each other. If they get a formula that works they keep using it repeatedly, repeatedly. (Prof. 011)

Although this professor felt there were a few professors at the university who were doing new things, he thought there was a need for more professors to be involved and a research group established to generate experimentation and innovation:

It is almost like universities have taken this role of [being in] commodities. It is not what a university used to do—open new knowledge. Courses online are more

like commodities, so the biggest problems are the designers. Right now, designers are holding back online courses. Get the designers to go a couple of extra dimensions again, rather than [just producing] a repetitive commodity. (Prof. 011)

Generally, professors seemed open to change and were aware that they were not yet using the full potential of the technologies available. The following exemplifies one professor's (Prof. 009) awareness of the possibilities for online teaching:

The more I'm experimenting with it, it [becomes] a lot harder and a lot more complicated than I ever imagined. It is just in the fetal stages at this point. I wouldn't even say infancy. It is like prior to that. (Prof. 009)

Overall, this section provides insight into professors' views on experimentation and innovation as they relate to the social system at the university being studied. There is evidence that some professors continued to push forward innovations after starting to teach online courses, but there is also evidence that a number of factors were present that hindered further development. The frustration with the lack of innovation happening was evident in the comments of some professors. Further, the findings demonstrate the presence of a small group of "early adopters" who continue to push innovation.

Structural and Organizational Change

The professors reported on structural and organizational changes that the university had undergone because of the introduction and use of online courses. These changes included greater influence exerted by DELT; more conformity in course offerings; the development of new kinds of programs; professors becoming more like businesspeople; and changes in the administration. These findings demonstrate that the

social systems into which online courses are introduced are also changing. The five sub-themes will be expanded on below.

As a result of more online courses being offered, Professor 005 felt that DELT had more influence over certain decisions, such as what courses are taught at the university:

There is an element now of that decision that has been moved outside the department. . . . They [DELT] do exercise that and it is not a big problem now, but as the number of online courses increase this becomes increasingly more rigid, so it changes the organizational structure or impacts on it in that way. (Prof. 005)

For Professor 015, if something went wrong or had to be changed, it could be “very frustrating” because sometimes the professors had to deal with two different places: DELT and their department. Indeed, another professor (Prof. 021) noted there was not much evidence of a liaison between DELT and the faculty in which he worked. The structure of the university, according to Professor 024, has changed as new positions had been created and new divisions set up in order to support the offering of online courses.

Professor 009 felt that online courses were introducing a certain amount of conformity in how courses were offered. Programs and courses were being designed in a consistent way as it made commercial sense to the university administration. Some professors (Prof. 004) noted that new programs had been developed to take advantage of online teaching. These new programs were primarily designed to meet the needs of professionals who could not take long periods of time away from their work to pursue such programs. The programs were, in some cases, hybrid programs that included a

combination of residential institutions, teleconferencing, readings, online components, and internships. Some professors also thought in a more commercialized mode. Several mentioned that, besides the work they were doing for the university, they were also either designing or teaching courses for other organizations as well. While Professor 010 recognized opportunities exist for commercialization, he felt that, in order to make it work and to create impetus for it to develop, there would have to be some benefit for the faculty and professors.

The use of online courses, according to Professor 020, may also lead to other areas of innovation as well. For example, the faculty she was working in was pioneering a Prior Learning Assessment Recognition Program for the university. The professor also explained how other services at the university were changing because of the presence of online courses:

[Students] can actually electronically send a draft [of their work] to our writing centre, [which] will give advice and guidance in the writing of that paper. We have librarians who assist them as well. . . . For any literature they need, the librarians will guide them through the process. . . . We are moving more and more now to electronic journals and textbooks to make it more and more accessible. So [online courses have] been a springboard to deal with this kind of area. [Students] can evaluate courses online [and] they can register online. (Prof. 020)

Professor 010 assessed that the university administration was just starting to come to terms with the implications of more courses being taught online. He referred to the fact that the senate of the university is starting to look at the implications of the increase in

online courses in areas such as professors' work, space requirements, and other aspects of university administration. He explained that "the awareness is coming, but it is slower than the activity." Several participants had either been contacted by a university senate committee or were actively participating in the work of the e-learning committee. At the time of this study, the committee was gathering information about what different faculties were doing in relation to e-learning. Professor 012 said it was important to get an understanding of what is happening at the university before seeing if there are any benefits that could be achieved through central coordination. This professor noted that the general availability of information online will have implications for the focus universities put on things such as library services.

One professor (Prof. 011) charged that the university was compromising quality by hiring less qualified people to teach courses designed by others: "We are getting depopulated at this point. It is not a university anymore. They are subverting [teaching] to a whole new cavity of people who are not professors, [but] more like sessional instructors" (Prof. 011). Professor 015 noted that because courses are organized differently, with work placements being carried out in the community, some of the course work is being moved away from faculty to those in other institutions. This results in professors getting less compensation than they would if all work was done on campus.

Some professors, including Professor 002, said they did not "see any major cultural shifts" associated with online courses. Another (Prof. 012) pointed out that online courses are still an add-on to the main mode of delivery at the university:

Up to this point it is still an addendum. Your main trust is still in the classroom and each department. Depending on availability of instructors, and other factors,

they are tacking on [online work] as an afterthought . . . or just as a small part of the program. I think we are a long way away from a full scale online system that is running parallel to the other one. (Prof. 012)

While this comment is perhaps not representative of what is happening in all facilities or departments, it does indicate that in some parts of the university professors are still feeling very little impact of the increased use of online courses.

In summary, significant changes are happening in many faculties and departments because of the increased use of online courses. There is evidence that centralized aspects of the university, such as the library, the writing centre, and access to administrative services, are changing because of the increasing presence of online courses. It is important to note that not all the professors felt that all the changes were improvements. For example, some professors thought their working conditions might deteriorate as a result of the use of online courses. This point is more fully explored in the next section, which focuses on terms of employment.

Terms of Employment

In the context of university teaching where professors are employed by the university, a part of the social system is outlined in the terms of employment. Professors indicated that there are many contentious issues regarding how professors are paid for teaching online courses. In some cases, the presence of online courses changed the terms of employment for professors and impacted their decision to adopt online courses.

For several professors, the online courses they taught were not part of their regular teaching load and they received extra pay for teaching these courses. Professor 019 mentioned that an online course is another “income stream” for him and he

appreciated having this additional income source. Another professor (Prof. 002) explained that he had the option of teaching the online course either as part of his regular teaching load or as an additional course for extra pay. He has taught it under both arrangements and did not consider it a problem either way.

Several professors expressed dissatisfaction with the rate of pay they were receiving for teaching extra courses online:

I really feel cheated, in that there are professors who teach one or two students in a course and they do it in their office as part of their load. I will teach a course of 40 [online] and they will give me \$106 per student. Now, some professors teach online courses with two and three students and it is part of their load. I don't know how they make these arrangements. This has been the problem at MUN, on the books; if you go through the collective agreement, everybody is supposed to get \$106 a student. (Prof. 006)

Another professor (Prof. 028) also commented on the rate of pay for doing online courses as extras:

If you can imagine the time I put in for 13 students, you feel a bit like a slave [only] making a thousand and some odd dollars for putting in more work than you would have in a semester course. (Prof. 028)

This professor also noted that many instructors were being hired on a sessional basis, especially retired professors. Another professor (Prof. 034) pointed out that the terms of employment for people teaching undergraduate courses online may be different for those teaching graduate courses as the more senior faculty teach the graduate courses. Professor 043 also stressed the unfairness in the way people were paid for teaching online courses

and observed that permanent faculty could usually avoid this by teaching the courses as part of their regular load.

One professor (Prof. 010) mentioned that there is an entrepreneurial aspect to the development of online courses at the university. Some courses were developed with the idea that they could be “marketed” outside the province. In some cases, professors were paid based on the number of students they had. Professor 043 saw this as potentially problematic:

Are you getting more students in your classes for good pedagogical reasons, or are you getting them because it makes more sense to make the evaluation really simple and get those numbers up, so that financially you get rewarded? . . . The method of payment is becoming registration oriented, which is going to mean that there are going to be pushes to have the online courses having a hundred or two hundred [students] versus having three or six or eight. (Prof. 043)

One aspect of professors’ terms of employment that indicates slow change by the university after the introduction of online courses was the course evaluation forms completed by the students. Certain questions on these in-class forms are now irrelevant in the context of online courses, such as: “Did the professor show up for class on time?”

One professor (Prof. 017) thought the increased use of online courses might mean that different kinds of supports would be needed at the university. This might require some people having to change the job they do or look for new employment. Professors at Memorial University could not be forced to learn online teaching skills because of their collective agreement, but professor 017 was aware of other educational institutions where

professors had been pressured to teach online courses or else face dismissal. He predicted “people will have to skill up quickly.”

There were indications that, because of the more flexible schedule associated with online courses, some professors may teach more courses. One professor (Prof. 023) said he might agree to teach an extra course if it were an online course rather than a classroom course. The online course would allow him more flexibility and would not interfere with other interests and research he wanted to pursue:

By having me do online courses, I will agree to teach an extra course over and above my teaching assignment here. I won't do it otherwise. I did last summer and I almost lost my mind. . . . I was tied down here. . . . Every day I would have to stop what I was writing and come in to teach and it was just too intrusive to my research and my other interests. (Prof. 023)

Another professor (Prof. 001) felt that, with online courses, professors who were on sabbatical or were not in the province for some reason could still teach. This would enable professors to teach more courses if they wanted to. Some professors, however, were concerned that problems might arise because of the development time and the operating procedure that afforded the professor first right to teach a course they had developed. . One professor (Prof. 005) suggested it would have the effect of locking up certain courses and would associate those courses with particular instructors in a way that classroom instruction does not.

Professor 019 stated that there are both extreme fears and extreme hype in relation to online courses. He indicated he does not accept the extreme view that online courses

will destroy university teaching. However, he felt that a number of professors fear the changes that may come because of the new technology:

I hear people talking some days about how, eventually, tenure will disappear and faculty unions will be smashed and everybody will be temporary employees hired by universities to do components of work. I don't know what the future will be; undoubtedly there will be some good things that come out of this and there will be some bad [things]. (Prof. 019)

The findings presented in this section reveal that the professors' terms of employment have an impact on their decision to start teaching online courses. While online courses are seen by some professors as an opportunity to earn extra money, many professors resent the low pay they receive when teaching these extra courses, in comparison to when they are taught as part of the load of a full-time professor. The different payment arrangements for the different terms of employment were certainly a matter of contention for some professors. Moreover, employment contracts protected the rights of professors and, at times, slowed the authoritative imposition of the use of online courses. Clearly, the terms of employment, which form part of the social system, influence professors' decisions to start or continue teaching online courses.

Communications Channels

Another element in the conceptual framework for the adoption of asynchronous online courses in this study is communication channels. The data collected in this study provide insights into how professors first heard about online courses and then gained more information about them. The significance of informal communication networks was emphasized and changes in the communication networks since the earlier offerings of

online courses at the university was highlighted. Insight into the communication networks that professors considered valuable demonstrates how these factors impact the rate of online course adoption.

Informal communication channels

Many professors conversed informally with colleagues within their faculty or at the university about online courses to see what they are experiencing and to get technical and practical advice. Some said they “had an idea of what to expect” since someone they knew had taught an online course. These conversations were usually with other faculty members in their area of specialization, though some talked to professors in other faculties who had experience teaching online. Notwithstanding the different subject areas, similarities existed— for example, the way students access the online course and how professors communicate with students. One professor noted that he went looking for specific information regarding how much additional time an online course would take. The professor he contacted cautioned him to expect a steady stream of e-mail. He also explained how the online format would impact his preparation and evaluation time. Some professors made the decision to teach online before they went to look for information from others. In many cases, the people at DELT were able to provide contact information for professors with whom they should talk.

Valuable findings also emerged from this study, concerning physical proximity and communication networks. One professor (Prof. 007) explained how sharing an office with another professor who also taught an online course allowed for the informal sharing of information. For example, when she started to experiment using real-time chat in her course, she had many discussions with her colleague who was already using this feature

in his course. She learned strategies that worked for him and intends to try them in her course. This professor noted that the group of people she can draw on in her faculty was expanding as others had started to develop online components, even for their on-campus courses. She further pointed out that the DELT training sessions were an excellent opportunity to meet people in other faculties. This professor tried to attend any kind of instructional session offered by DELT and met people in other faculties who taught online courses, which enabled her to hear about some of the differences between online courses in other faculties.

Despite the clear indication that professors were communicating with those near them about online courses, it was also evident that many professors were also contacting other sources of information. The nature of the innovation and the fact that courses can be observed at a distance are contributing factors to the use of somewhat distant resources. Professor 023, who recently started teaching at MUN, explained he had asked other professors about workload, teaching strategies, and evaluation before agreeing to teach an online course. He had also contacted professors at the university where he did his PhD and the discussion he had with them was more of a “debate about the use of online courses as a means of instruction, rather than practical or technical matters”. Since teaching his first online course, he started working with another professor to co-design and co-teach another online course.

Professor 034, who began teaching online courses after many in her faculty were already doing so, explained that she sought out information from professors in her faculty, professors in other faculties, and people at other universities in Canada and the United States. Through these contacts she was able to view courses being taught at two

other universities using a limited password. Other sources of information she used to obtain information about teaching online include articles in academic journals and the course designers at DELT. She said her “main preparation [for teaching online] was talking with other people.” Professor 034 suggested that it would be helpful if there were more in-service training and discussions at the university on the use of online courses. While praising DELT for doing a “pretty good job” bringing in a number of speakers for their training sessions, Professor 034 did not feel people were always well prepared to teach online courses. Although there appeared to be some interchange among professors, usually it was related to a specific problem rather than a more general discussion. For example, Professor 34 indicated that she will ask people who are near her a quick question such as, “I can’t find this or that on WebCT.” Similarly, Professor 043 explained that he drew on the general office staff near his work area to get technical help. He said: “I knew where my resources were in terms of people who could help me out and I did not hesitate to tap their doors”. This professor explained that he had also promoted discussion within the faculty about the impacts of technology by expressing his views and organizing debates.

Communication channels changed over time

Some professors noted, however, that when they started teaching online there were not many professors with online experience they could talk to. This appears to have been typical of many faculties, even up to four years ago. Some professors noted that the communication channels have changed since the early days of offering online courses at the university. Professor 018, who was among the first to teach online courses, stated that there were not many people he could have talked to or relied on in the early days.

Further, no formal avenues had been set up to encourage discussion among the few professors who were teaching online at the time. One of the first professors to teach online courses at MUN observed that communication networks were becoming more formalized. According to this professor, the information sharing that occurred among professors in the early years of online courses has been “supplanted” by the things that are being done by DELT. Initially, only a few professors organised workshops and seminars on their own; now, DELT has assumed the role of “instigator” for online development. While he still chats and discusses articles and other ideas with some good friends, he indicated that he is less inclined to become too involved with helping others put courses online and suggests instead that they go to DELT for advice.

Varying levels of communication

Some professors gave examples of how they had useful communications before teaching online, while others remarked on the lack of communication for teaching this way. Some professors commented on the opportunities they had for good communication at the university. A number of professors had an opportunity to talk with some of the earlier professors who had taught online. The people they talked to and the courses involved were not necessarily in their subject area, it however exposed them to how an online course worked. Professor 015 mentioned there was some informal discussion in her faculty. Professors would give each other advice about how to approach such aspects as the discussion forum; they would also compare techniques and offer tips. For major difficulties other professors could not answer, professors would contact DELT and ask for assistance. Professor 015 praised DELT’s capabilities, stating that “they are the experts; if you have a question about how to do something they are the ones to go to.”

This professor also noted that in the early stages of offering online courses, a liaison person located in the department was available to carry out “troubleshooting” and act as a “link” with DELT. The professor thought this person had been “really helpful” given that they had “so many problems the first time around”. She thought the person in the position was really being missed and the position ought to be reinstated. The importance of this type of support position was also upheld by others in the faculty who were among the first to teach online courses.

In another faculty, the growing number of professors teaching online courses was mentioned as a source of support. The strong commitment to online courses in the faculty meant that a “very supportive environment” had developed whereby professors developed new teaching strategies and shared them with each other.

Several professors identified factors that limited the amount of communication they had in relation to online courses. Although he was aware that the faculty had offered an increased number of online courses, Professor 022 had not had much discussion with other professors before he started teaching the course. However, before commencing to teach online he met with the professor who designed the course to discuss the material. Professor 022 had taught the course face-to-face and was quite familiar with the content, but he wanted to review how the course would change when taught online. He was teaching the course because the professor who designed it did not have enough time to teach it. Other than these discussions with the professor who designed the course, he had very little interaction with other professors on this or any other matters. He attributed this lack of communication to two related factors: first, he taught the course as a sessional instructor; and second, he was not physically located at the university where he would be

more likely to come into contact with other professors. Similarly, Professor 028 noted that there was not much discussion about online teaching before she started to develop the course she taught. She attributed this to the “top-down imposition” of online courses in their faculty. Given the importance other professors placed on informal communication in their decision to adopt and develop online courses, the lack of this type of communication networks is indeed a serious hindrance to adoption of online courses.

Helping other people

Another theme that emerged from the research relates to how professors helped each other teach online. Professor 002, for example, helped other professors put together Power Point presentations. Another professor (Prof. 004), whose course had been recognized as a high quality course, was often asked to show it to other professors who had heard of it due to word of mouth or because they were referred by DELT. Despite the fact that some professors were open to looking at what others had done and borrowing ideas from them, many were not. One professor described professors as “a fiercely independent breed” that does not wish to emulate what their colleagues are doing. Professor 003 explained that he had reviewed courses being taught by two other professors because he wanted to broaden his understanding of what others were doing. He found that these other professors were using techniques similar to his own, but he did not alter his approach much because he had strong ideas about how he wanted to teach his own course.

When one of the first professors (Prof. 031) to teach online courses at MUN started doing so, there were very few people instructing online courses anywhere. His work online was, as far as he was aware, the first ever in his subject area. After

publishing articles about this work in academic journals, he began to receive a great number of inquiries from all over the world. Some interested individuals wanted to use part of his course in their teaching, while others just wanted to look at what he was doing. Due to the number of inquiries, he decided to make one of the modules available to anyone who wanted to look at it. Professors from other departments came to talk to him and he was asked to give presentations to various faculties and groups within the university.

Formal communication channels

Communication networks have become more formalized in recent years. This was evident by the number of professors who had a high level of dependence on DELT as they developed courses online. For many professors, the first information they received about online courses came from DELT. Some of the professors had considered developing correspondence courses and DELT staff suggested that if they were going to teach the course or program by distance, they should consider doing it online. DELT organised seminars and workshops, which drew on experienced people who had been among the earliest to teach online courses at the university. These early adopters shared strategies for developing content and engaging students. Several professors became interested in online teaching as a result of these demonstrations or seminars held on campus. However, Professor 028 mentioned that attending the seminars and seeing the demonstrations offered by other professors raised many questions in her mind. She started to think about the market for her own course and some of the problems that might arise from moving online. For her, it was not just the technical issues of how to do it but

also one of questioning whether she should do it. She wondered what the implications were for her and her students.

The training seminars offered by DELT were attended by a number of the professors. Some of them partook of the seminars when the courseware used by the university changed and they wanted to learn how to use new features, while others attended them to learn the basics before starting to teach an online course. One professor (Prof. 019) indicated just how dependent he was on DELT for information about online courses:

There was no one in the department who had done this before and I didn't speak to anyone in other departments about it. I didn't look at what other people were doing. I didn't read very much on the teaching theory or anything like that. I just went to the instructional designer who I was working with. (Prof. 019)

The level of professors' dependence on DELT and the Web designers could have implications related to who takes responsibility for pushing forward innovations.

Professor 028 admitted to being "totally unfamiliar" with online courses before she actually taught a course online. Given that she did not understand the terminology used in some of the components of an online course, she recognized how heavily dependent she was on a technical support person in the faculty and the Web designer from DELT.

Having taught the course once, she realized it would take another round before she was truly comfortable with the format. Professor 029, who developed a course that involved a lot of graphic equations, said he received most of his direction from DELT because there were not many courses like his online. Since Professor 043 was located in the same building as DELT, he "spent a considerable number of hours" with the two instructional

designers involved in developing the course he taught. He estimated that, for the first four weeks of the course, he spent at least an hour a week explaining the trouble he was having and requesting assistance. Later in the term, he did not visit the instructional designers' offices but would phone and ask a couple of brief questions. He would often ask the course designers to change aspects he did not like, such as the way components were presented. Professor 043 also spent considerable time on his own, dealing with technical aspects and learning how to operate online. For example, in the early courses he taught before WebCT was introduced at the university, he had trouble printing assignments students would send to him. It had taken him a considerable amount of time and conversations with other staff, such as secretaries in the department, to work things out.

Other communication channels

Other sources of information about online teaching—particularly for some of the earliest professors—included conferences and journals. The importance of outside sources of new information in promoting innovation was apparent. In the early days of online teaching, these outside contacts promoted a valuable level of awareness. More recently, the outside contact has been just as instrumental in encouraging continuing innovation and experimentation. Professor 017, who has a background in information and communication technology, explained how attending academic conferences was critical in advancing his involvement in online courses. It was through contacts that he learned about WebCT and then at the 1996 NA Web Conference in New Brunswick that he realized the significance of this new program. Up to that point, people had used Web

pages to present material and post notes, but there was no stable, comprehensive piece of software being used. This professor became a Beta tester for an early version of WebCT.

In the early days of the Internet, newsgroups and mailing list servers were another important means of exchanging information about online courses and the use of technology. There was some exchange of information and discussion about software and how to get resources, but the focus was not really on educational issues.

Other communications from various sources also impacted professors' adoption of online courses. Professor 004, for example, mentioned how the feedback the faculty received from the accreditation people influenced the amount of attention being paid to standards for online courses. Two professors (Prof. 009 and Prof. 012) noted they were involved with a university senate committee on education technology that discussed the implications of online courses. According to Professor 040, some professors have an interest in creating a mystique about the use of technology that may discourage people from using online courses. Several professors interviewed had academic backgrounds related to either educational technology or software development. Five professors mentioned that they had been involved in co-teaching of courses and that this had helped ease their adoption of online courses.

For Professor 006, one of his first sources of information about online courses was former students who had taken some of the first online courses offered at Memorial University. He happened to meet the students by coincidence and they started discussing teaching techniques and design issues related to online courses. Another professor (Prof. 010) explained that his main source of information was from a person the faculty hired

who was just finishing his PhD and was interested in online teaching. He had some expertise in the area and was quite helpful because of his interest in pursuing it.

Another theme related to communication channels was that of ownership and confidentiality. Some professors were reluctant to share information with others. Initially, people were hesitant to speak about what they were doing, but in small group sessions they began to share information.

The professors obtained information about teaching online from a number of sources and many were self taught. One professor (Prof. 014), who became quite skilled at Web design, said initially she got most of her information searching online. She had taken traditional correspondence courses and found them “boring” so she started to look for other options. When this professor began learning about online courses, her enthusiasm grew. Another professor (Prof. 029) stated he was “self taught” in obtaining the skills he needed to develop material for his course. He explained that he had developed an interest in electronic typesetting about 12 years previously and had “read every book that had come out on this topic”. He learned to create PDF files and add colour, graphics, and other features to online documents. Indeed, several professors mentioned the hands-on nature of their learning in relation to their teaching online. Professor 015 said she had learned from a more hands-on trial-and-error approach, with feedback from students. Professor 010 noted it is rare to get an opportunity to discuss or think about the implications of teaching courses online because you are “involved in doing things rather than thinking about it”. Similarly, Professor 033 said she had read some articles but suggested she learned more from getting involved: “There were some

articles that came around on online learning, but in the end what I figured out was it had to be me. I had to work it out myself and determine what the problems were”.

While teaching, and after the course was finished, this particular professor became aware of a number of issues she would have to work on for the next offering. There were problems she could deal with up front rather than wait for them to come up during the course.

The findings presented in this section provide insight into the way university professors share information about online courses. Aspects of information exchange in the context of a university were highlighted. In particular, the importance of informal conversations between professors is evident. Professors indicated that communication channels have become more structured in recent years as more professors have started to teach online. Factors that might undermine the development of effective communication channels emerged, such as the hiring of sessional instructors who were not physically located on campus, and authoritative decisions to impose the teaching of online courses. The findings illustrate the complexity of the communication networks involved in the professors’ adoption of online courses.

Change Agents and Institutional Supports

Change agents and the presence of institutional supports influenced the adoption of online courses at Memorial University. Three types of change agents in the adoption of online courses at this university emerged from the data: the office of Distance Education and Learning Technology (DELT), course designers, and others. In addition, the importance of technical support was highlighted. These four themes will be elaborated in the sections below.

The Office of Distance Education and Learning Technology (DELT)

The role of DELT as a change agent involved encouraging the use of technology, facilitating training sessions, and providing technical and other support. Many of the professors commented on the significant role DELT plays in terms of providing assistance to individual professors, as well as in the overall promotion of online courses. Professors attested to the importance of a centralized office in promoting the use of online courses at a university.

A number of professors identified the role of DELT in encouraging, assisting, and facilitating their adoption and use of online courses. Professor 003, for example, noted that this agency was “really forward, in promoting the whole idea” and pushed to have high quality courses offered. He praised how valuable they had been in helping with the design and encouraging him to be innovative. DELT had been instrumental in inspiring him to incorporate audio and, later, video resources into his course. When this professor was first considering the design of his course, DELT worked with him to explore options and review courses taught by other professors. Professor 011 recognized the role that DELT had played in getting more people online. Given the low skill levels of many of his colleagues in terms of designing online courses—as he stated, “they have no clue”—he charged that “if continuing studies [DELT] were not here, they would not be online”.

One professor (Prof. 009) described the level of support from DELT as “tremendous” and “phenomenal,” noting that this type of support is not present in many other universities in Canada, or the United States. She illustrated her point by explaining that, when she decided to add video-clips to her online course, DELT gave her access to a studio, a producer, a cameraman, and an editor. Another professor (Prof. 020) stressed

how essential the DELT services are, stating that, “You can’t use online delivery unless you have a really good infrastructure.” She was aware of other institutions that were attempting to offer online courses without the proper infrastructure, and the quality of their program was not as good.

Another role that professors commonly rely on DELT to fill is to initiate and push innovation. Many professors explained that they let “the technical people over there” take the lead in terms of suggesting modifications and major innovations. The comments of another professor (Prof. 008) reinforced the role DELT played in this area. He remarked that they “have always been pushing for more and more electronic technology”. However, Professor 011 was upset that the staff at DELT were not being innovative enough.

The technical support staff at DELT developed a level of expertise in offering online courses because of their experience with many different courses. Professor 022 said that “the technical people keep us well informed on what is going on” and “they are helpful” with any technical problems. Another professor (Prof. 031) commented that a particular technical support staff person encouraged professors to try new things. She said that “without her, I don’t think the course would have been half as good as it was.”

The early adopters of online courses at MUN fully appreciated the importance of DELT. They did not have the services and supports that are available today and there were many problems. At the very early stages, Continuing Education (which later became DELT) did not encourage professors to develop online courses. The division was concerned that online teaching was being adopted too quickly; so, professors who wanted to offer a course this way had to have the computer skills to be able to design it

themselves. Also, there were many technical problems, which are now dealt with by the help desk, that professors were expected to solve themselves at that time. The lack of proper infrastructure led to a great deal of frustration on the part of both students and professors. While some professors were discouraged from pursuing online courses, others, were able to get support because of their past record of successful innovations.

In terms of support, professors who had taught courses for several years recognized many improvements had taken place over the years. Professors who taught the first online courses explained that there was almost no professional development in the early stages, with the exception of a few one-day workshops dealing with the basics of creating a home page. Gradually, as things became more organized, more workshops and seminars were offered. Now, although professors have computer experience and are capable of designing and running their own online course, many of them depend on the training they have received from DELT.

Professors who have offered online courses more recently usually had participated in several workshops on how to use the courseware program WebCT. Some professors (Profs. 007, 015, 022, 042, 043) explained they found the workshops useful, not only because of the content but also because it was an opportunity to meet other professors who taught online courses and engage in discussion. This kind of exchange exposed them to new ideas and made them aware of strategies professors were using in other subject areas. Some seminars were also held by professors who had taught online courses in the past and had talked about developing the content and strategies to engage students. Some of the professors who had taken training related to WebCT said it would be helpful for them now to do more advanced training in teaching online courses. A few professors

explained they had also received a considerable amount of one-on-one training from DELT individuals who had designed their courses. Even while the course was in progress, they could call the person they worked with in DELT if there were aspects they did not understand.

Participants emphasized the importance of having staff with the technical and design expertise they needed to get their course up and running and DELT provided this. Many professors explained that the course designers they worked with had encouraged them to explore options available for advancing course content online. The course designers were aware of techniques and resources that could be used to follow through on a professor's idea when that professor was not certain how to proceed. As one professor said: "Having that support and resources with people who are creative, innovative and supportive—I think that is pretty key" (Prof. 003). Another person explained the importance of the continued support offered while teaching the course: "I would just call if I couldn't figure something out. There are a lot of people over there [at DELT] to connect with over the term" (Prof. 015).

Professors who had taught in the early days of their online offering at the university were very appreciative of the level of technical support, knowing how much it had improved. In the past, professors had to have the technical skills to be able to develop their own online courses and also maintain the infrastructure needed. Resources such as a help desk were not in place and when problems arose for students, they would phone the professor. This involved a lot of stress and frustration on the part of both students and professors when students had trouble registering into the online course, or with other technical issues. One professor (Prof. 006) expressed her appreciation by saying; "these

two fellows are excellent, so they have made my life simpler.” The help center at DELT was open from 10 in the morning until 10 at night during the time when this data was collected.

DELT also organized many administrative functions that would be difficult for an individual professor to organize, such as invigilation of tests at various locations across Canada and, occasionally, internationally. DELT also had the resources to coordinate applications for major grants from government agencies that would be beyond the capacity of many professors, faculties, or departments.

In summary, as well as being the source of equipment and facilities for developing online courses, professors looked to DELT for advice on matters essential to professors offering online courses. It was also evident that the level of support offered by DELT had grown since online courses were first offered at the university, particularly in terms of the training that DELT provided. Based on the data, it is clear that this office fulfilled the role of “change agent” at the university and had a positive impact on the rate of adoption of online courses by professors.

Course Designers

One aspect of teaching that changes when instructing online is that professors, who usually work alone, often have to work with another person to design the course. One key staff person the professor works closely with is the course designer who helps organize the course content for online delivery. Participants discussed the nature of this relationship and how it might change their role as a professor. The course designers not only provided technical advice but also served as change agents in the sense that they encouraged and facilitated online course adoption.

Many professors described a close working relationship with the course designer. One professor (Prof. 001) explained it as follows: “I basically wrote the course manual, she edited it in very precise detail and she would ask me: how do you want to put this online?” (Prof. 001). One professor (Prof. 018) stated that there has to be a great deal of trust in the instructional designer. When it works properly, “it is a very close relationship” and the professor has to respect the skills of the instructional designer and be willing to take advice.

Despite the fact that most professors found the course designers helpful, one participant reported that she had heard of other professors having problems with the course designers:

They are very busy across the way [at DELT] and they don't get back to you right away. I know some people who tried to make changes to some of the courses and the courses started and they still haven't had the feedback. . . . They don't have enough people over there to do the work that is necessary. Not having that immediate mediation here [in the faculty] anymore, I think some people are just very frustrated this past year. (Prof. 015)

Some professors were concerned about the loss of control to Web designers in the course design process. One of the problems with change agents is that they are very different from those they intend to change and often have higher social status, which is a barrier to their role as change agent. In this case, however, university professors had higher social status than the change agent and certain dynamics developed. While loss of control of the operation of the course was an issue for some professors, others said they had been assertive and maintained control. Professor 003, in particular, maintained that

she had not had any problem working with a course designer because she considered herself assertive and was comfortable using online technology:

If it is not working for me then it is going to be changed. . . . But I also know that there are colleagues who are more junior who don't necessarily use the technology to its full potential. There have been considerable frustrations with delays in doing up text and all these other things, which are really not related to being online but working with another organization which sometimes seems to be in chaos. (Prof. 003)

Similarly, Professor 012 said there was no loss of control "in terms of what I would do and how I would do it . . . it was totally up to me." He encountered some difficulties at the onset, getting the course designer to present the material in the way he wanted but understood that some of the problems were because the course designer did not understand his subject area. He noted that he was forceful about obtaining what he wanted in his course and once he had developed a working relationship with the designer things worked well. Another professor (Prof. 001) said she modelled the online course after her classroom course and "whatever I wanted put in that course was my discretion."

Another professor (Prof. 019) indicated the instructional designers did a very good job and explained that he had not lost control in any way:

I was not really conversant with the technology. The relationship I had with [the course designer] was [that] she asked me what I wanted and I explained to her and she did it. . . . There were a lot of bells and whistles available that I could have used but I chose not to because I didn't think there were a lot of useful effects from them. . . . So it is very basic; that element of it is very stripped down and

just exactly what I need. . . . I really am very keen on how good they are; they are very supportive. (Prof. 019)

Another professor (Prof. 002) noted that he retained control over his course because he had a considerable amount of training with WebCT and had designer access to his course, which allowed him to make changes whenever he wanted. Professor 010 actually found that working with the course designer gave him more control over the course development process by advancing suggestions:

I have found them, as instructional design people, to be more helpful, really. I haven't been constrained. With links and everything you can put into the online stuff, it actually gives you more opportunities to add things and opens it up more to give you more control. (Prof. 010)

Conversely, other professors felt they had lost control over their online course in some way as a result of working with a course designer. Professor 006 explained that in the early days when he first started to teach online he was not familiar with the technology and people from DELT assisted him with the process. One professor (Prof. 011) noted that there are actually very few professors who design their own course. He further indicated that although he had full control over everything in the course, recently DELT had taken control of some things such as issuing of passwords and access to the course. Professor 018 iterated that professors should remain in control of their courses, but they should also be willing to accept advice.

Some of the issues related to a perception of a loss of control concerned the level of technical skills of the professors. Several professors pointed out that the lack of technical skills of some professors can at times lead to misunderstandings and problems.

Professor 014, who had previously worked in a position where she helped professors prepare their courses for online delivery, said it is not so much a loss of control issue as it is a misunderstanding of what the designer can do:

It is more of a faculty wanting to get a certain concept across and the instructional designer saying you can't do that because of copyright issues or because the video is too long to video stream. The bandwidth won't support it or those types of things. So sometimes it tends to be quite tense that way. (Prof. 014)

Based on her experience helping with online course design, she further made the point that professors often misunderstand the constraints under which course designers are working:

I can't do anything until you give me the content. If you are two months late giving me the content, then that puts the whole thing off and the course is going to be late getting uploaded and it is going to be late getting coded. . . . The instructional designers tend to take the notion that you are the content expert, you are the one who knows what should be in this course; my role here is to help you achieve the instructional objectives that you want to achieve in the course. (Prof. 014)

Although one professor (Prof. 024) felt that overall the course designers have been "very helpful," she had problems when changes were needed and the designers were too busy to do it quickly. She suggested that professors who teach online would be "better off if they learned how to do these things sometimes on their own." She advocated providing the kind of training that would provide professors with the "basic skills" necessary to make minor changes to the online courses they teach.

Another issue that emerged surrounding the relationship between professors and course designers related to the level of understanding of the subject matter that the Web designer should have. While complimenting the technical skills of the course designers, Professor 021 noted that she also needed some advice regarding the pedagogical aspects of using technology but was unable to get that kind of advice:

It hasn't been an especially useful relationship; their expertise is the software—this is what the system can do. If you want to do this, this is how we can do it. When it comes to determining if this is better—is there any evidence that video works better than a group discussion?—[they are not able to help]. So, I can see options, but as to which one would be best for my course material, that is not what their purpose is, but that is what I need. (Prof. 021)

While Professor 041 was comfortable using computers and designing Web pages, he did not think these kinds of things were a good use of his time. He explained his views on the relationship between course designer and professor:

There is a funny relationship that develops there actually. Normally, on campus, an instructor is in charge of the course. When you move to an online course, some of your control has to be given up to technical staff because you can't control everything. You certainly can't control the server or that sort of stuff, so you give up a certain amount of control. . . . We are the experts on content, they are the experts on teaching, and I don't find that works at all. I don't find them any more expert on teaching than I am [laughing]. . . . They do the point and click stuff and I don't worry about doing that; I would not feel uncomfortable about doing that myself because I think I have learned enough over the years to do it. At the same

time, if I had to actually maintain the Website fully and get all the buttons in and all that kind of thing, it would add to it immensely [in terms of time]. I would probably be less efficient at it than the technical staff. (Prof. 041)

Some faculties at the university employed specific individuals to work with professors who have courses online. These individuals had content knowledge in the courses being taught, as well as technical skills. They were thus able to help in the development of new courses and act as a facilitator for the process.

These findings provide valuable insight into the relationship between professors and course designers. Overall, while professors “respect” the advice of the course designers, they like to remain “in control” of the course. Although they conceded that it was at times an awkward relationship, professors saw themselves in the more powerful position. This was especially true if they had an understanding of the technology or were assertive. The professors’ level of technical expertise was a considerable variable that influenced their relationships with the course designers.

Others

While professors identified DELT and course designers as change agents, other individuals were also seen as agents of change—namely administrators within their department and other faculty members. Several professors cited support from administration within the faculty as a factor that set the strategic direction for acceptance of technology and the use of online courses. The participants identified specific individuals within the administration who were promoters of technology. In both the faculties of business and of nursing, administrators were important in promoting the use of technology. These administrators were experienced at organizing distance programs

and recognized the potential for online courses to open up the programs to a larger student population. In another faculty, the group pushing the adoption of technology was a program redesign committee. When examining its current program, the committee decided that offering the program online would better meet the needs of its potential students and thus enhance the long-term viability of the program.

The faculties of nursing and business had technology facilitators who assisted in streamlining the process of moving from classroom to online teaching. These facilitators helped train professors and assisted in working out the “bugs” that developed in the early stages of adoption. Many professors credited the importance of this support person in facilitating their successful adoption of online courses. Professors also had the impression that the university administration, in general, was pushing for more online courses.

In many cases, the overall university environment and the professors’ peer group were viewed as change agents. In terms of online course adoption, professors commented on the importance of support from other faculty members who were teaching online courses or who were integrating the use of information and communication technology into their classroom teaching. Professor 007 explained that it is “really good to have someone to talk to” and that she was fortunate to “have three or four people that I discuss [online teaching] with”. Professor 031, who had co-taught a course, noted this kind of experience was very important in building her technology skills.

In some cases, professors noted they had to educate the administration within a faculty about the implications of offering an online course. Sometimes, the administration was not aware of the process of developing an online course or the resources that were available to assist professors. One of the first professors to teach online courses at MUN

stated that if he had not pioneered a number of other innovations within the faculty, the head of his department might not have permitted his pursuit of this teaching option.

Professor 043 said he had been organizing discussions within his faculty about online courses and the integration of information and communication technology in teaching. He also conceded that he had drawn on knowledge within his faculty by informally asking other professors for help.

Another source of encouragement for change was students. Many professors talked about “demand from students” as a major factor in their decision to teach an online course. In many instances, students had nearly completed a program and were experiencing difficulties making it to campus to complete the final courses needed. In some cases, students who were working out of province contacted the professors or the university to suggest that the courses be offered online. As one professor said: “The fact that there is a need by students who really can’t come on campus to access higher education is something that motivates me” (Prof. 034).

In summary, change agents were present in various forms at the university. In addition to the course designers and other people who worked at DELT in formal roles, there were others who, through their actions, emerged as change agents. The findings presented in this section provide insight into how professors view the role of change agents.

The Importance of Technical Supports

Although the professors reported fewer technical problems now than when online courses were first offered, technical problems still arose as an issue for many professors. The number of problems experienced appeared to relate to “trialability.” Trialability

refers to the ease of trying this new technology and is associated with the amount of training required by the professors before they started teaching online. Also, the number of problems reported related to complexity— that is, how complex professors perceive technical aspects of online courses to be. While the technical problems may have decreased since the early days, there may still be a lingering perception that there are more problems than actually exist.

Many of the technical problems professors experienced were spoken of in the past tense and professors generally thought technical problems were decreasing. One of the first professors (Prof. 031) to teach an online course at MUN explained that, with the first few courses, it was a learning experience for everyone involved. Numerous technical glitches had to be worked out but a great deal of support was available if anything went wrong. Others reported that in the early days of online courses students had trouble accessing or getting started in the course and would often give up. In addition, the server sometimes went down and links changed. Situations such as these were exacerbated because many professors did not have the technical savvy to deal with problems when they arose. Another common problem at the time was the equipment students were using to access the course, although these were problems that impacted individuals rather than the entire class.

One professor, involved in offering courses in other countries, noted that with some international students many technical problems must still be overcome because of the poor infrastructure in their home countries. Professor 042 described the situation before the help line was put into place:

At 10:30 at night I may get this call from a student who is out in some remote corner of Newfoundland or Labrador. They are saying, 'I am here at the computer,' and you get this intense, anxiety-filled voice of someone who is having trouble connecting or getting material or something. I am ready to go to sleep and my brain has shut down. I'm not a technical person and I have had to say, 'I am sorry I can't help you. I really don't know what is going on with your computer.' The first year was bad because they had our telephone numbers and we did not have the support here at the university so we were getting these frantic calls from students at home. (Prof. 042)

While the situation has improved dramatically since then, problems still occur with students not receiving material for the course on time or not having the necessary equipment to access the course.

The importance of the university's help desk for online courses was emphasized by the professors. Instead of dealing with the problems themselves, the professors tended to refer the students to the help desk. As one professor (Prof. 023) conveyed:

I felt once I started answering technical questions I become a technical support centre. I did not want to go there at all. If you answer those questions the first time you have to explain why you are not answering them the second time. So I referred every technical question to technical support. Their problems, like posting of attachments, students typing stuff and posting it and losing it in cyberspace—they pretty much ironed themselves out. (Prof. 023)

Despite the general view of professors that there were less technical problems now than in the early days, they still experienced specific technical problems. For

example, the system was down for three weeks and Professor 004 felt disorganized and disconnected from the students. Another time she had to be out of the province for the final three weeks of the semester because of a family emergency and when she returned, she could not get access to her records for the course:

I got back ready to do my marking, which meant I had to go online and check everybody's participation in the course and assign participation marks and see if there had been any more discussions. [But] they ... had actually closed access to all the courses ... and I was horrified. There was no way I could submit marks and I had to raise a stink. In the end, they found somebody who could load it onto another system and give me another password so I could access my course, but you are at the mercy of techies who really don't know what you are doing. That would not happen in the classroom. So that was frustrating. (Prof. 004)

Other technical problems recently experienced by professors included: students not being able to access the course from their work site due to firewalls their employers had established; maintaining up-to-date links; restrictions of the software package that did not allow students to do simple things they needed to in the course, such as underline text; opening and reading e-mail attachments from students that were created using different software from that used by the professor; computer viruses; the forum being down for a day or two; obtaining access to the Internet when traveling; problems when the university switched platforms from SiteScape to WebCT; printing attachments; accessing course material; and students' lack of computer skills. Professor 017 explained that there will always be some kind of technical difficulty in teaching; it is just a matter of being prepared to deal with it:

I don't know whether it comes with experience or it comes with common sense; if you go to your classroom and you find that you don't have chalk for the board you are going to be running downstairs to get chalk. So the next time you usually bring an extra piece of chalk. . . . So it is the same thing in an online environment. . . . You always have something else as back-up. (Prof. 017)

Conversely, some professors stated they had never had any technical problems and had not had any complaints about technical problems from students. Professor 007 noted that in recent years the technology has improved to the point where she is skeptical of students saying they are having problems:

I could give the benefit of the doubt for a week or two, but five weeks. Where were you? Why didn't you e-mail me before now? So I am starting to get a little strict on that. In the past I was a little bit more flexible but it can get ridiculous. (Prof. 007)

The findings regarding technical issues indicate that many of the technical problems experienced in the early days have not been present in recent years. However, professors still experienced technical problems. It was evident that professors discussed technical problems with each other, so perceptions of technical problems were formed not only from a professor's personal experience but also from the shared experiences of other professors. Technical problems were not just related to technology but also to the procedures that were put in place to deal with them, such as training programs for professors and students, a help desk, and other supports. The presence of these supports, while seen as a positive, also led to questions about "loss of control." Professors were sometimes concerned that they were left at the mercy of "techies", which was an

enormous change from the classroom environment where they were, to a large degree, on their own.

Summary

The findings related to the second research question and the institutional level of analysis were presented in this chapter. While universities are, in many ways, a unique type of institution in society and each individual university has characteristics that distinguish it from other universities, many of the findings were supported in the literature on the institutional factors that affect adoption. In this chapter, the characteristics of Memorial University of Newfoundland and their impact on professors' adoption of online courses were documented. Both the general institutional environment (see Table 2) and more specific efforts to encourage the adoption of online courses (see Table 3) were examined. The findings of this chapter were organized using the relevant elements in the conceptual framework—namely the nature of the social system, communication channels, and change agents and institutional supports.

The social system within an organization has been found to influence the rate of adoption (Christensen, 1997; Daniel, 2000; Rajasingham, 2005; Rogers, 2003). Established patterns of behaviour and organizational structures determine the innovativeness of social systems. In the early days of online courses at Memorial University, several professors were significantly ahead of the administration in their attitude towards offering online courses. The Division of Continuing Education, which later evolved into DELT, actually discouraged these professors from teaching online. The administration of the university and DELT wanted to move slowly with the adoption of online courses so they could explore the implications before committing resources.

Several professors who had the technical skills to do so moved ahead on their own and boldly pushed forward innovative teaching strategies.

DELT centralized many of the online teaching supports, which now makes offering online courses simpler. Since its inception, DELT has played a significant role in driving innovation at the university. Notwithstanding this central role, the decentralized nature of the university was still evident; some faculties and departments were very active in offering online courses, whereas others were still resisting this innovation. In some faculties, professors met resistance to the adoption of online courses from the administration and other professors within their faculty. Conversely, other faculties promoted online courses and pressured professors to move courses online because they wanted to offer whole programs online.

Other aspects related to the innovativeness of the social system at the university were also highlighted in this research. Findings reflect how professors experimented and innovated with online teaching. While some professors were experimenting in numerous ways, others were not. Another part of the social system relates to the professors' terms of employment. Aspects of professors' employment, including the way they were financially compensated for their work, impacted their adoption of online courses.

It is important to note that social systems at the university are not static. As well as being influenced by the nature of the social system, technology is also changing the social system in significant ways. Structural and organizational changes were happening at the university. For example, DELT was becoming more influential at the university, thereby affecting decisions made within various departments and faculties. Professors

were also concerned about the commercialization of education and the impact this might be having on universities.

This research provides insight into both the formal and informal communication networks tapped into by professors to obtain more information about online courses. While the formal training offered through DELT was important, the benefits of informal networks—especially in the early stages of online adoption—as highlighted in this study, were also considered of value. The findings reveal how informal networks can be encouraged and nurtured. In addition, the importance of sources of innovation from outside the normal networks of professors was emphasized. New and visiting professors, as well as contacts made at conferences were significant in this regard, especially among the early adopters at the university.

Most professors consulted with colleagues within their faculty before teaching an online course. Many of them described their information gathering as “informal conversations” and, in some cases, where there was no person within the faculty to talk with, DELT facilitated such communication channels by providing contact information for those in other faculties. DELT also brought in guest speakers and offered training sessions. These sessions, besides providing valuable information, also created opportunities for professors to share information informally and make new contacts in other faculties. Communication networks were becoming more formalized over time. When online teaching was still in its infancy, professors were more inclined to spend a great deal of time helping others who were starting to teach these courses, whereas more recently they tended to refer those seeking help to DELT.

Several professors talked with their colleagues at other universities. Sometimes, these connections were made through a network of professional relationships within their area of study. In other cases, the professors talked with people at the university where they had completed their graduate studies. These findings indicate that although “proximity” in terms of physical location is still important—in that professors talked to those physically close to them—professors were also talking to those who were physically distant. Another finding related to proximity and communication emerged in relation to professors’ terms of employment. Sessional professors did not have much of an opportunity to discuss anything with other professors and expressed feelings of “isolation” because they were not physically located on campus during the daytime when most other professors were there.

Other concepts in relation to communication networks are evident in this research.

Several professors credited the importance of “opinion leaders” in pushing forward the use of online courses. Most often these were people in administrative positions at the university. Additionally, certain individuals were seen as the “experts” in this field, who were pushing forward innovations. Professors who were among the first to teach online courses were on their own, to a large degree, in the early days. Now, newcomers to this field have good support and colleagues nearby they can talk to if they need help.

Change agents are individuals or organizations that encourage people to adopt innovations. This research shows how various individuals and groups have influenced the opinions of professors and encouraged them to adopt the use of online courses at the university. DELT, course designers, and others emerged as change agents at the university. The importance of the centralized role of DELT in promoting the use of

online courses and providing the training professors needed was apparent. The services DELT provided, such as technical and administrative support, were also instrumental in helping professors as they moved toward the online format. Such a university-wide agency allowed for help desks to be established and course design expertise to be developed. Other sources of change agency existed at the university. Administrators in several faculties and departments were agents of change, as were peers and the overall environment. Moreover, it is evident that a centralized and decentralized diffusion effort can exist at the same time.

The role of the instructional designer is also, in some ways, that of a “change agent.” Instructional designers provide the technical expertise that many professors need before they can adopt. Most professors described their relations with the instructional designer to be supportive. The research provides insight into this relationship and the concerns that professors had about loss of control. Professors were forceful in ensuring that their courses were designed in a way they envisioned as being effective.

Valuable insight into the role of change agents in promoting the use of online courses at Memorial University of Newfoundland has also emerged from this research. The role played by DELT provides evidence of the importance of such a centralized organization that encourages adoption, as well as the necessary support services at the university. This study also explored the dynamic of the relationship between professors and the other professionals they often work with as they offer online courses. The importance of support within faculties or departments is apparent in how the adoption levels of online courses vary.

Professors' experience using information and communication technology was, to a large degree, influenced by the level of institutional supports offered. For some professors, potential technical problems were a concern. A number of those who taught online courses in the early days of their offering at MUN were able to cite examples of significant technical problems. However, in more recent years, the number of technical problems has decreased and the improved support infrastructure available at the university has lessened the concerns surrounding technical problems. Such concerns were less of a problem with younger professors and those who were more adept with technology. Another aspect that adds to the complexity of online courses is how suitable different kinds of courses are to the online format. For example, variables that can impact on how the online course should be offered include things such as: subject area, level of the course, the number of students, the organization of the course, and the availability of resources. The newness of the format and the lack of research or established rules of practice all add to the demands of offering an online course.

The research findings presented in this chapter answer the second research question in this study by providing insight into the institutional factors that influence the adoption of online teaching. In the concluding chapter, the theoretical and practical implications of the findings will be further examined. As well, areas requiring further research will be delineated. Lastly, the interconnectedness of the levels of analysis, as depicted in the conceptual framework and supported by the findings presented in this chapter, will be discussed. Findings related to the next level of analysis outlined in the conceptual framework—the individual—will be presented in the next chapter.

CHAPTER 6

INDIVIDUAL LEVEL OF ANALYSIS

In this chapter, findings related to the individual level of analysis are presented. Information regarding the decision-making process, the nature of change required for online course adoption, and factors impacting the individual professors' decision to adopt will be delineated. The core level of analysis in this study is the individual professor and this research provides insight into how the individual professor changes when he or she adopts the use of online courses.

Decision-making Process

The findings of this research provide insight into the professors' decision making process in the adoption of online courses. Three decision-making processes were evident: authoritative, collective and individual. These processes will be elaborated and then how professors came to teach online courses, the role of experience, and the change in attitude will be delineated.

Some decisions were authoritative, with pressure being exerted on professors to teach online courses. In many cases, this was not an outright order; rather, control was exerted through the use of rewards and punishments by people in authority. In some instances the faculties in which the professors taught made a collective decision to move some courses or whole programs online, while in other cases the professors individually made the decision to adopt the online mode. Professors recounted situations ranging from gentle encouragement from administration to outright fear of losing a course they had taught for a period of time. Several professors felt they had little choice but to offer an online course. As one professor commented:

Well, to be quite honest, the primary motivating force was that Memorial really wanted to move to online delivery. I felt strongly that if I didn't do it, then someone else would be asked to do it. The problem is [that] this is a course I had been teaching on campus for a very long time, that I had developed myself initially. I felt I was in danger of losing a teaching opportunity unless I followed with Continuing Education [recently renamed DELT] with their intent to put it online. So it was more that, than my own interest in the technology. (Prof. 005)

He further explained that little discussion was being generated in the department about the merits of moving online. Professor 007 described a similar experience of being asked to convert a course she was teaching in class to an online format: "I really liked teaching that course on campus and I hated to give that up. . . . So it was something I really had to do. It wasn't a choice. It was something I had to do." She further explained that when she first started teaching online, she was not certain what she was getting involved with but was not opposed to trying something new. After teaching online though, she came to enjoy this method. A third professor (Prof. 028) remarked that she started to teach online as a result of an authoritative decision by administration:

It was a top-down imposition because of a grant. Most of us were trying to fit it in around very busy schedules. That made it not pleasant and, therefore, we did not sit around and talk about it, except in retrospect. (Prof. 028)

A number of professors asserted that their decision involved some kind of collective decision and, as professors, they had some level of input into the decision to move courses in a program online. Professor 004 explained that a program review was done and a collective decision was made within the department to offer the program by

distance. Many students in the program had to travel to St. John's and were finding it difficult to do so, which interfered with their completion of the program. By offering courses online, the university would be able to attract applicants from other parts of Canada and the world, adding to the overall viability of the program. Notwithstanding that it was a departmental decision, rather than her choice, Professor 004 welcomed the opportunity to experiment with a new format.

The department in which Professor 012 taught made the decision to offer some courses online and professors were asked to volunteer to teach online. When no one came forward, he was asked and agreed to do it. Professor 018 recognised the university had a long and ongoing commitment to distance education. She taught in a faculty where it was expected that some courses be offered at a distance and teaching online was seen as a

natural progression of that expectation and commitment. In another subject area,

Professor 020 explained that prior to her arrival a decision was made in the faculty to offer some of their programs by distance. This decision was arrived at after a group of professionals in the subject area made representation to the faculty.

Students who had trouble getting to campus to take the required courses requested that they be given the option of doing it by distance. Professor 024 said most of the courses in the degree program she taught in were online because the degree was designed for students who wanted to continue their studies after completing a diploma. These students worked all over the world and the best way to offer them the opportunity to continue their studies was through the online mode. She fully supported this approach and was "somewhat involved" in the decision to offer the courses in that manner.

One of the primary factors encouraging professors to adopt the use of online courses related to the rising needs among students who could not attend classroom courses but who needed to do additional courses. For Professor 011, one of the first professors to offer online courses at MUN, teaching online was something that evolved. While teaching evening courses, he started putting course notes online because a number of his students could not make it to class. Over the years, this approach, which was considered more convenient for students, evolved into a fully online course.

Others, such as professor 034, were not only motivated by the needs of students who could not come to campus but also because they personally wanted to try something different. Professor 014, for example, assisted other professors in moving their courses to the online format and when the opportunity came to teach a course this way she did not hesitate. Another professor (Prof. 031) explained he had some experience using technology in education and had taught a distance education course before. He took the initiative and worked to gain the support of DELT and faculty members to offer one of the first online courses at the university.

For some professors, the opportunity to become an online instructor was viewed as a good career move. For Professor 019 not much of a decision-making process was involved in this professional move:

I don't have a permanent job here. I am a contractual employee. So this was an opportunity for me to do something for pay. . . . I wanted the money and I thought it would be a good career thing to do. I thought it would be a good thing to have on my CV ... when applying for jobs in other places; it would demonstrate another skill in another area. (Prof. 019)

While it was a new experience for Professor 019, in many ways it was a continuation of his previous work since he had taught courses by correspondence. He stressed that the student demand was also a determinant in his considerations.

Professor 023 made the decision on his own to change to an online format, even though there was some gentle pressure in the faculty to teach online courses. He was interested in learning the technology and in doing something new. When selecting the courses he wanted to teach online, he chose courses that were theory-based because they were better suited for online delivery. He surmised that the other courses he taught would be more difficult to teach online. In the end, he wrote to the administration in his faculty asking permission to teach the course online.

How Professors Came to Teach Online Courses

Having established that different decision-making processes are evident at the university level, it is useful to examine more closely how individual professors came to teach an online course. Individual professors each had different circumstances, yet some themes did emerge from the data. Some professors moved to online courses because they were asked to do so by administration. Several moved to the online format on their own initiative, whereas others were in a situation where a decision was implemented to offer online programs they taught. Two other factors that influenced the ease of moving to online courses were previous experience teaching distance education, and the utilization of new technology in classroom teaching.

When professors were asked how they came to teach an online course, a number of themes emerged. Many of the professors explained that they had been asked by administration to teach a course they had previously taught face-to-face or through

correspondence. One professor (Prof. 002) pointed out that he was asked to teach an online course by DELT. He explained that the way he came to teach the course was “mostly accidental” in that a professor with more seniority was originally slated to teach it but had to pull out at the last minute. Professor 002 was asked to fill in and scrambled to quickly gather material together using his class notes and some supplementary material. Professor 007 explained that she had been asked by the head of the department to teach an online course that someone else had designed but did not want to teach. This professor had already taught the course on campus and this familiarity with the course content made it easier. Although initially she was concerned about not having the necessary computer skills, after several in-services she felt comfortable. Each successive time she taught it, this professor became increasingly familiar with the format. Another professor (Prof. 027) explained that she had been asked by the dean to take on an online course in a desperate situation. Apparently, there were some problems with a course during the first part of a term and along with another professor she was asked to do what they could on short notice to save the course. In that offering, they were “developing it on the fly” and preparing lecture notes just a week prior to being posted to the course Web site. For some of the professors, the programs in which they taught were moving to an online delivery format and they were asked if they wanted to head in that same direction.

The professors were not all keen to teach online though; some were mildly reticent, whereas others felt they were forcefully pressured into teaching online. Professor 012 explained he was reluctant to teach an online course. He eventually agreed to do so because no one else in the department was willing to do it at the time. Initially, he agreed only to design the course and teach it several times to get it up and running, as he was

curious about how it would work. Once he started teaching the course online he found it worked better than he had expected. However, he eventually “turned the course over” to a graduate student because he preferred classroom teaching.

Another professor (Prof. 028) recounted her experience:

I was forced into it. . . . Someone in their wisdom thought it would be good for us to offer distance courses for students across Canada. So there was a grant received by our professional development group and we were the group they worked with.

So, it wasn't my initiative. (Prof. 028)

When Professor 028 started to develop the course she was apprehensive because of the amount of time involved. As the process continued she became intrigued and challenged by the task of developing and teaching an online course.

Time was also a concern for another professor. One of the first professors (Prof. 031) to get involved in an online course at the university started by using computer technology to help teach large undergraduate courses in his subject area. The first time the director of the program asked him to become involved in the effort to use computers in teaching he refused because he lacked the required time. Only when the program director said they could not get anyone else to do it did he agree to become involved, albeit reluctantly. They started off in the early 1980s by conducting evaluations and then offering remedial modules via computer. Eventually, they got rid of the classroom lecture portion of the course and offered the whole course on the computer for on-campus students. Professor 021 then stopped teaching for a while and when he returned in 1994 he became aware of the possibility of online distance courses. He had been teaching a correspondence course for some time and surmised that he could teach this course online.

With the help of a graduate student and the support of DELT he developed some aspects of the course. He had also taught large courses on campus and wanted to increase the interaction in his classes. The online course was offered in the summer of 1996.

While these professors were asked to teach online courses, with the exception of the few cases noted, there were usually no indications they felt “forced” or “coerced” to teach in this medium. In contrast, several professors started teaching online courses on their own initiative. Professor 003, for example, said he began to investigate offering an online course two years prior to the actual adoption. He had been aware that some online courses were being offered at the university and had attended a one-day workshop on the topic. From there, he initiated some discussions within his department about the possibility of offering online courses. Since the request to teach the course had to go from the director in the department to DELT, he first had to convince colleagues within his own department:

There was some initial confusion from the director as to the general availability or the difficulty of offering Web-based courses. I think that may have stemmed ... from the lack of knowledge about the process. (Prof. 003)

Once the process commenced, DELT’s support was invaluable to him in terms of encouragement and technical assistance.

Professor 014 explained she had always been interested in computers and had taught herself a great deal about online course design and online instruction. She was one of the first in her faculty to request a desktop computer and the first to integrate technology into course delivery. When the faculty started to move toward online courses, professor 014 was asked if she would be interested in teaching this way. Another

professor (Prof. 041) got into teaching online because he had been away from the university for a while and was getting back into teaching and looking for new projects. He explained he was not entrenched in anything and had always had an interest in instructional innovation and new communication media. This instructor was asked to teach a correspondence course that was not working well. One of the first options he explored was to move it to the online format.

Professor 011 was another who was among the first to experiment with the use of technology in teaching at MUN. He began to incorporate some aspects of the Internet into his teaching back in the mid 1980s. He used listservs and e-mail as ways of communicating with students. One of the biggest constraints at that time was that many students lacked access to computers. In fact, at that time, it was unusual for a faculty member outside of the subject areas of math and statistics to have access to a computer. As computer availability for students increased, Professor 011 began to put more material online. Before the World Wide Web was fully functional, he created a newsgroup and posted information there so students and others outside class could print or comment on the information. Initially, he put his class notes online. Then, students did not want to come to class so he started to put more content online to meet their needs:

The next progression came along when more and more students began to ask whether or not they needed to attend class because the notes were online. So, I started to put chunks of content online and developed my own course online through Web pages. (Prof. 011)

This same professor eventually started using WebCT to organize his material as he managed to get an early version of WebCT through contacts.

Some professors believed online delivery was the best way to teach a course so they requested to teach it that way. Another (Prof. 020), who also filled an administrative role, said she wanted to get the experience of teaching an online course. When the opportunity came to instruct such a course she availed of it. Professor 023 agreed to teach a course only if he could do so online. Others were motivated to teach online due to student demand and need. In some of the cases at this university, innovators had to push to get the course offered online. This was the case with one of the earlier courses to be offered at the university because the people responsible for distance education at the time were hesitant to move too quickly into online teaching. The staff was already working with other professors and could not offer any assistance in putting this course online.

Working with another professor, Professor 023 proceeded to put her first course online. A few years later, when she was involved in developing a second course, DELT was more open to it and a great deal more supportive.

It is significant that some of the early adopters of online courses experienced difficulty obtaining approval or the necessary technical assistance to offer a course in that manner. This would demonstrate the “contingent” aspect, as discussed in Rogers (2003). It is also significant that a number of professors were moving toward online courses on their own initiative. This was based either on a personal interest in the technology or a recognition of the need that existed among students for such courses.

Some professors started teaching online courses because the program they were teaching moved online. The main reason the program moved online was to broaden accessibility for students or to enhance the viability of the program. Other professors were less involved in the decision to put programs online. Professor 021 stated she came

to teach an online course because she “had no choice.” Administration had decided the program she was teaching in was moving online, so her courses were now being formatted for online. With respect to her decision she explained:

It was either switch completely the kind of courses I wanted to teach, which may or may not have been much of an option, or go with the flow. So the university made the decision to go online, not me. (Prof. 021)

This particular professor is not happy with the move, yet she does appreciate that the decision was made because a great number of students did not wish to attend class on campus.

Some professors had taught the same course in several different formats.

Professor 029 began teaching correspondence, moved to teleconferencing, and then taught an online course. He explained the university had been very active in offering courses at a distance and one of the core courses in a program he taught was then offered online. He was not partial to teaching by correspondence or teleconference, so it was a combination of that lack of satisfaction with these modes and the administration asking if he would like to try something new that prompted him to teach online. However, while he understood the need for access by students who are unable to attend class, he was still apprehensive about the quality of the online course: “I’m not entirely happy about distance as a way of learning. I feel this is a second rate kind of way. I think you would probably be better off in class” (Prof. 029). Professor 015 took a similar road as she started to teach online. She taught courses online that she had previously offered in the classroom, by correspondence, and by teleconference. The move from one mode to the next was gradual rather than sudden. E-mail and online components were integrated into

the correspondence and teleconference courses; thus, the courses had online components before they became fully online.

In the cases where whole programs were transferred online, more direct pressure appears to have been placed on professors to move to the online format. Some professors welcomed the change, while others felt pressured because the only other option available to them was to abandon courses they had taught for a period of time. However, professors who moved to teaching online courses were not always convinced that it was the best way to offer the course. Some professors also talked about the gradual nature of the change to the program. In some cases, it moved from class to correspondence, then integrated technology such as teleconference or online components, before migrating totally online.

Professors further explained how other factors influenced their adoption of online courses. Professor 006, one of the first to teach online courses at Memorial University, became intrigued after seeing a demonstration of the first online course at the university.

As well, he talked to another professor who taught an online course and from there he asked the administration if he could convert a course to this new format. Permission was soon granted and since then he has moved several other courses he teaches to the online format.

Some professors with academic backgrounds related to educational technology adopted the use of online courses quite easily. Professor 009, for example, explained that her research area was the use of educational technology and instructional design. Prior to teaching the course online, she felt very comfortable with technology and was proficient in the use of WebCT. For her, teaching an online course arose because of her own

motivation and a natural response to the needs of students. Professor 008 explained he had been involved in teaching correspondence courses going back to the mid 1970s. As e-mail became more common, he started to exchange information that way with his students. The next step for him was then to create a Web page that supplemented the correspondence course he was teaching. He took the time to write the code for the Web page because he thought it was important to make it available to his students. By the late 1990s, the university was moving many courses online and he was asked by DELT to offer his course totally online. Professor 017 explained he had an interest in communications technology and he had been experimenting from the early days with pre-Web communication tools. During his time as a graduate student he worked with his professors helping integrate technology in their teaching. In addition, he had carried out some research related to computer assisted learning. When he started work at Memorial University, the dean of the faculty he was working in asked him to do some research in the area of information and communication technology in education. He attended several conferences and eventually became a beta tester for an early version of WebCT.

Several professors did not consider themselves to have gone through any “adoption process.” Rather, they considered their use of online courses as a “natural progression.” Professor 011 was adamant he had not gone through an adoption process:

I never really adopted anything, I have evolved it. It is a very slow methodological evolution, but I think most professors adopt. They get to a point where they have to make a decision to adopt. In my case it has come about very slowly and I didn't even know at what point I was there. (Prof. 011)

This professor stated that he and his colleagues have a professional responsibility to be aware of things that can help meet the needs of students. If that happens to be putting courses online, he said, they should be open to that. Professor 017, who had been involved with using technology in teaching, made the point that he did not like the idea of an “adoption model.” He argued his point thusly:

I think it [technology for online teaching] is to a large extent something that is being pushed on some faculty members, particularly those who are not part of the technology. In my case, I did not adopt anything. It was something I came to by default, by being blown [in] to it. So I study it; it is part of what I do. It is an ontological commitment, as well as something that self actualizes me. (Prof. 017)

Professor 017, who strongly believes in the positive impact information and communication technology can have in education, noted that there were a number of professors at Memorial University who did not think technology should be used in education. Another professor (Prof. 019) said others in his faculty were of the opinion that, by teaching an online course, he was compromising their employment situation and the whole quality of university education. Professor 043 expressed his distress at the amount of time and energy being expended by administration in trying to “push” people toward teaching online. He was concerned that professors were not fully aware of the implications of moving to more distance and online courses.

Professor 003 started to use online courses to respond to student demands. He explained that a number of students, who were out of town for part of the year, were having trouble accessing required courses. By making another option available to them, students would be able to finish their degree sooner.

According to Professor 020, the difficulty in making a transition to online teaching might be influenced by what teaching methodology a professor preferred. She stressed that moving to online teaching was not a huge difference to her because she adopted a facilitator role, regardless of the mode in which she taught; whereas the transition would be more difficult for someone who used the traditional lecture method.

Some professors mentioned other factors that influenced their adoption of technology. For example, during the early days when Professor 031 was using computers to teach courses on campus, they were limited by factors such as the general availability of computers. Also, he was not happy with the way his subject area could be taught by correspondence, since for him it was too colourless and static. One thing that concerned him about online courses was that, if the number of students increased, the amount of time it took to teach the course would also expand. He was still working to find ways of managing large classes online.

The findings from this research show that individual professors had various individual motivations for teaching online courses. An understanding of these individual factors is important in terms of designing institutional or managerial supports that are based on a fuller understanding of how factors at various levels are interconnected.

The Role of Experience

Another issue that largely influenced professors' decision-making process was their previous experience with distance education and technology. As well as having implications in terms of trialability and compatibility with previous teaching practices, prior experience was also intertwined with the decision-making process. The general

view of professors was that it was easier to make the transition to online teaching if they had experience teaching at a distance or using technology.

Several professors noted that they had some experience teaching at a distance, either through correspondence or teleconference courses. Prior to moving to the online course, Professor 006 explained he had experience teaching distance courses via teleconference. His instructional strategy altered once he moved online as communication became asynchronous, whereas the teleconference was synchronous. He was also cautious not to make his online courses too static and thus become “simply a correspondence course online.” He structured his courses so students discussed course material online. While developing the course he found “it was a whole new way of thinking because this was now totally asynchronous.”

Before moving part of a course online, Professor 018 taught a course in correspondence mode for 10 years and now currently teaches both correspondence and an online offering of the course. Before teaching online, another professor (Prof. 019) had offered several correspondence courses over a number of years. It was suggested by staff at DELT that he might want to consider teaching online. He was intrigued from the beginning and looked forward to the interaction he would have with students, because that was a component lacking in the correspondence course. As he explained the situation:

It was just kind of happenstance. I had taught many other courses by correspondence. I was going to be adding a new correspondence and they asked do you want to make this one an online course? (Prof. 019)

He was teaching as a sessional at the time, thus it became an extra course for him to teach.

Before teaching online, Professor 021 also had experience teaching the same courses by correspondence and teleconference. She believed it was much easier to make the transition from teaching correspondence and teleconference to online than it was to make the initial change from classroom to the distance format. Moving from correspondence to teleconference and then to online was an easy transition for her. Some professors were experienced using other communications equipment. For a period, Professor 008 taught by teleconference and used a whiteboard to draw diagrams and graphs for students; this worked quite well in his subject area. Another professor (Prof. 020), who had been involved in teaching distance education for years, used television

learning in the late 1970s and had experience with some international work where she was exposed to correspondence courses, audio tape, and video-taped classrooms.

Professors' experience with online courses and related technology came in various forms. Several professors assisted other colleagues in moving courses online or developing material for distance education before they taught online. Professor 014, for example, assisted professors in moving their courses online before she taught a course herself in that manner. She found this experience of helping to design and assisting with the teaching of online courses very valuable. Professor 017 had graduate level training related to educational technology and had been involved in producing media products in a business environment. Three other professors had taken online courses as students. Professor 023 was exposed to this technology as part of his doctoral program.

Another factor that influenced the adoption process for many professors was their previous experience using related or similar technology. Professor 001 explained that in her classroom teaching she regularly used technology such as Power Point and was able to integrate some of that material into her online course. Also, a year previous to moving her course fully online, she developed a Web site for her classroom course where she would post class notes and list links to other resources relevant to her subject area. She realized “how convenient it was to have a place where you could just post stuff.” Professor 002 explained that he had experience designing and maintaining Web pages. Since starting to work at the university, he had a Web page and made lecture notes, grades, hints, and useful links available to students in courses he taught. He explained why he started to use technology in his classroom courses:

I had a pretty good awareness of the Web. The reason I started was merely convenience. I don't have to hand out assignments and things like that; people come and get them [online]. It has reduced the amount of photocopying that I have to do. It has reduced the amount of administrative stuff I have to do. (Prof. 002)

This young professor said that, for him as for many persons of his generation, it is a natural impulse to use technology in teaching. Another professor (Prof. 015) stated that, while she does not have a Web page for her course, she does work with students in developing good Web search strategies and on how to assess the credibility of sites. She also conducts some basic communications with her class through e-mail. Another professor (Prof. 022) uses technology such as Power Point presentations and often refers students to Web sites related to course content as part of his classroom teaching. He noted

that, textbook publishers are now beginning to provide strong Internet support for text books which can be used as well. He has a Web site of his own under development, but has not had time to finish it. Another professor (Prof. 023) has created his own Web page where he posts material for all his courses, but according to him, it is “desperately in need of updating.” Professor 023 also uses e-mail frequently to keep in touch with students and other faculty members. He checks it from home and, when he travels, he never goes more than 24 hours without responding to a message. Before teaching the course, Professor 033 used some presentation technology in her classroom teaching, such as Power Point, slide shows, and videos. While she said she was not “a computer hotshot the way some people are,” she was comfortable with e-mail and word processing. Like Professor 033, other professors had used technology prior to teaching online but did not consider themselves to be overly proficient. A number of professors had used e-mail, Internet searches, word processing, Power Point presentations, audio cassettes, and video cameras in their classroom teaching and preparation. Professor 003 considered himself to be “proficient, but not highly proficient,” whereas another (Prof. 010) described his computer skills as “pretty minimal” and had sometimes had trouble with e-mail attachments.

Some professors liked to use new technology as soon as it became available. Professor 004 considered herself to be a leader in the adoption and use of technology. As she said: “I have a long history of being slightly ahead of my pack in terms of usage of technology.” She was the first graduate student at her university to complete a thesis using a word processor on a computer. More recently, she conducted research on “spam killer software” and encouraged professors at Memorial University to use it. Another

professor (Prof. 011), whose interest in computers go back to the 1970s, had been experimenting with computers before he started to integrate them into his teaching. Professor 014 was the first in her faculty to start using multimedia in class and remained very enthusiastic about the possible uses of technology in teaching.

The comments of professors presented here suggest that those with experience using technology are more likely to make the transition to teaching online courses. However, a number of professors who taught online courses had very little previous experience. Professor 028, for example, did not have any experience teaching at a distance or online. She was not familiar with some of the terminology being used to explain how the course worked and depended on a graduate student working with the faculty to help her comprehend what was happening. Similarly, although having

developed and taught a correspondence course, Professor 027 had no prior experience teaching online so the technical assistance was especially valuable at the beginning:

I had to learn how to use a scanner, all that kind of stuff— the forum; just those little ... technical details which were not very technical or very detailed, but little things you had to sort of iron out. (Prof. 027)

Professor 015 explained that when she started working at Memorial University in the early 1990s she had little technological experience and had not used a computer much. Since then, she taught herself how to type, use word processors, e-mail, some graphics programs, and presentation technology. She found herself learning new things as required and found it “enjoyable and fascinating.” Professor 005 also had no experience with technology before teaching online and depended on the seminars held by DELT to keep up with new developments.

Professor 012, who stated he had a “classroom mind-set,” soon realized the potential benefits of online teaching:

It is in its infancy, I would think, and what will happen is that you will get a generation of scholars and teachers and stuff who will have come through the whole thing. They will not be in my situation where I was carrying a classroom mind-set into a non-classroom delivery system; and I am not going to change very much at this point. (Prof. 012)

The findings presented here demonstrate the importance of various kinds of previous experience in influencing the decisions of individual professors to adopt. Several professors indicated that their experience teaching at a distance had made it easier for them to move to online teaching. Also, experience and level of comfort with information and communication technology was a factor that influenced professors’ decisions to use online courses.

Change in Attitude since Starting

The findings presented next demonstrate how the attitudes of the professors changed after starting to teach an online course. In examining the decision-making process of professors as they adopted the use of online courses, it became evident that the professors’ views changed over time. This is significant in that the nature of online courses and the organization of professors’ work would allow for relatively easy trials and discontinuance in the event that attitudes became more negative. As professors gained experience teaching online, many of them became more positive in their attitude towards online courses. A few professors said their views of online courses were more negative after teaching one, but they were a small minority. These findings will be

elaborated in this section. This is an important finding because of the possibility of easy discontinuance and the weight that potential adopters place on the comments of those who had already taught online.

Many professors noted that their views on online courses had become more positive after teaching such a course. Professor 001 explained that, initially, she did not think the online experience could be as enriching and as effective as the in-class. Once she taught online and reviewed the quality of course papers, she was pleasantly surprised:

I kind of thought the online experience would not be as good as the classroom experience. . . . At the end I was pleasantly surprised that it went better than I thought, because I thought there would be technical problems. I thought, ‘Oh God, how will they understand this without having the lectures?’ and things like that, but I guess I provided my notes and I posted things. The technology worked.

(Prof. 001)

Over time, Professor 007 also grew to enjoy teaching online despite initially being “very hesitant to do it”. At the end of the first course she was surprised to find “it was OK” and after several courses she had come to “really enjoy it.” She also noticed that her positive perception varied from semester to semester based on the dynamics of the group of students in her class. In some semesters she had a relatively quiet group, but in others she had more varied discussion and, in fact, had to mediate arguments between students.

Professor 008 has found himself becoming more positive about online courses the more he teaches in that mode of delivery. He initially deemed it only limited to computer enthusiasts but then came to see it is open to almost everyone. Professor 008 was also optimistic that the current problems and limitations will continue to be dealt with and

new possibilities will emerge. Professor 009, who has a background in education, explained that she had always been enthusiastic about this new technology. She continued to learn new things and thought there was still much to learn about this relatively new way of teaching.

Professor 010 was optimistic that, in the future, technology would improve to mitigate the problems he encountered as he taught a course. For example, he said:

We are not there yet ... but we think we are getting there where [the students] could actually interact and do more things for themselves and maybe do the presentation and show it to [the professors]. They can't do that right now with WebCT; we don't have any animation or streaming video. Now that is coming, I can see that coming, and we are thinking that this next round of courses we will

be able to experiment. (Prof. 010)

This professor foresaw a time in the next two years when students in his online course will give online presentations using graphics, animation, and streaming video. He expected to experiment with these the next time he offered the course.

Professor 011 stressed he was neither overly enthusiastic nor overly skeptical, despite the “hoopla” around online courses:

I went in with my eyes wide open. There was no illusion on my part. I did not make any claims of grandeur. . . . It is helpful; it is convenient for people; I will go with it. [For] some courses [the online format] does not work; they are not convenient. . . . I am getting over the hoopla of this stuff, you know. There was a lot of hoopla five years ago, now people are starting to see the realities. (Prof.

011)

Professor 014 had always been a strong advocate of online courses and her teaching experience confirmed her view:

I have always loved online courses and I continue to be a real advocate and promoter of online courses. If anything, my conviction is that [in] online courses [students'] work is stronger. (Prof. 014)

Professor 017 had done a great deal of experimenting and research related to online courses. He related that he was always supportive, but initially he viewed the Internet as a medium of communication with other students and nothing more. Since then, he has become more involved in exploring the possibilities of the medium for teaching.

Another professor (Prof. 019) explained that he approached the teaching of online courses with an awareness of the extreme views that these courses would either solve all problems or be the end of classroom teaching:

I'm probably a bit more positive on it now than I was at first. At first, it wasn't that I was negative about it; it was that I was skeptical about it—skeptical because there is often a lot of hype about new technologies. It is going to be this great thing that is going to really revolutionize [teaching]—a wonderful tool! I really thought that was hype. (Prof. 019)

However, having instructed online, he became quite enthusiastic and felt it really added to the interactivity in correspondence courses. While he recognized the importance of responding to the needs of individuals who are unable to attend in-class courses, he did not consider it as a replacement for the traditional classroom setting.

Professor 020 said that she started out enthusiastic about online courses and became more so as she learned more about the possibilities:

You don't really know what you are getting into. You know it is on the Internet, so you think, "OK, is this really the same as the old types of correspondence courses?" You just check it, then gradually you see the features; you start dreaming and think how you can get something done. The more you use it, the more creative you become, and that is what all of us have learned. (Prof. 020)

Professor 023 explained how his opinion of online courses transformed and how he became more enthusiastic about them. When he started teaching online, he was concerned that the quality of courses would be compromised. Later, he believed some courses can be strengthened through online delivery:

If it is done right and if the course copy lends itself to online teaching, which is a really difficult thing to do—if you have good materials and if you are vigilant in how the course is established, the content can be strengthened. The course can be a stronger course online. (Prof. 023)

He still had concerns about several issues though. For example, he has had students with very low levels of technology expertise. Overall though, Professor 023 was surprised at how well the online course worked, yet he would not like to see all courses offered online.

In the beginning, one professor (Prof. 027) thought contact with students would be lacking but once she started teaching she realized the kind of meaningful contact you could have with students online. Professor 028 explained, as well, that her own opinion of online courses had been elevated slightly since starting teaching, despite still having some unresolved concerns. She was worried that universities will pay too much attention to online courses and lose out on the kind of informal learning that goes on at a

university. She also did not approve of the idea of on-campus students taking online courses instead of attending class. Similarly, Professor 033 felt that the lack of classroom contact would be a real disadvantage for students. She enjoyed interacting with others in her class when she had been a university student and she feared that this interaction would be lost online. However, once she went online she realized there can still be a degree of interaction through the discussion forum and via e-mail.

Although in the minority, some professors were skeptical when they started teaching online and their experiences teaching in this medium confirmed their views. Professor 005's initial opinion of online courses was that they were a second-rate form of teaching and that students would therefore expect them to be easier than classroom courses. The period he spent teaching online did not change this view. Another professor (Prof. 002) said he began online teaching without any preconceived notions, but as he taught the course he did not like it as much as teaching in a classroom. He found he missed the face-to-face contact and disliked not knowing the students. Professor 018 explained that she had some serious concerns about online teaching and thought universities should examine the way online courses are designed and the kind of preparation required by students who take these courses.

After developing and teaching an online course, Professor 003 was more appreciative of the time and effort involved in putting a course online. He also explained that he was "a bit skeptical" about the level of interaction and rapport established in the course. While students were posting some messages, they were not doing it as much as he expected or would have liked. He still wondered why this was the case, and supplied two possible explanations; One reason he offered was that the material presented in the text

and on the Web page was so clear there was no need for discussion. A second possibility was that students were holding back because they did not know their fellow classmates. This lack of discussion among students was therefore one aspect of online teaching that troubled him.

Although Professor 012 could see a place for online courses at the university, he decided it was not for him and he stopped teaching online courses:

In a sense, for me, teaching is a performance. I like to see the whites of their eyes. I had a feeling that I was not going to like sitting at the terminal and teaching the course. It was interesting for a one-shot or two-shot deal, but it is not something I would do continuously. (Prof. 012)

Professor 021 also started out having doubts about teaching online and remained so after teaching several courses:

I still don't like them. I see their advantages. I still see their limitation no matter how fancy we get with video clips or whatever in them. The technology possibilities are a lot better than what we can do right now, but online is better than distance [correspondence]. Is online better than the classroom? I am not sure. We try to make it as good as [online], but it is not the same. (Prof. 021)

Several professors were initially very optimistic about teaching online courses and maintained this level of enthusiasm. Professor 024, for example, said her perception of online courses had not changed since she started teaching because she was quite familiar with them before actually teaching one. She had taken several online courses before offering her own course. Professor 022 explained that he was positive at the beginning and felt that teaching online had worked out well:

I am not surprised that this has worked out as well, or at least it seems to have worked out as well, as I had expected it to. I knew the vehicle was there. Before this we had agreed to distance education courses via correspondence, which has been very difficult because the contact with the student is almost nonexistent.

(Prof. 022)

He noted that the level of contact with students in online courses is much greater than in the correspondence mode.

It is evident from the findings that professors formed well-developed views of online courses after they had taught in that medium. These views are meaningful from the perspective of professors continuing to teach online courses, as well as for their impact on potential future adopters.

Nature of Change Required by Professors

The nature of the change required when adopting something new is an important factor in an individual's adoption. In relation to the nature of change required by professors as they adopt the use of online courses, two major themes emerged from this research: changes in the role of the professor and changes in the nature of class. Findings related to each of these themes will be presented.

Changes in the Role of the Professor

The findings in this section provide insight into the perceived compatibility of online courses with the values, experience, and needs of adopters. In this section, the different skills needed by professors when they teach online, as well as other aspects of role change, are presented. For example, there are different flows of information online and the role of professor is not as central compared with that of classroom teaching.

Some professors noted they became more reactive while others said they had to take on a new role as an innovator. Professors also thought the role change depends on the personality and background of individual professors. The degree of role change required by professors is an important aspect of adoption because innovations that require greater role change are often slow to be adopted. Several scholarly writers have discussed the difficulty of encouraging the adoption of “discontinuous innovations” (Archer et al, 1999; Christensen, 1997; Duderstadt, 1998; Moore, 1999).

According to the professors interviewed, one aspect of the role change is the different skills needed to teach online. One professor (Prof. 001) noted that professors had to be technically proficient if they were teaching online courses. At the very least, they had to be comfortable using a computer. She sensed that most professors were comfortable at this point, but if the technology used in online courses became more complicated there would be a need for more training among professors.

Professor 002 thought that while “performance ability” online was not as essential a skill as in the classroom setting, other abilities such as promoting discussion were more important in online courses:

There is an element of acting in terms of getting people’s attention and maintaining attention and maintaining interest. It is very definitely needed in a classroom course and really not needed, in nearly the same way, in online courses. ...You have to have mainly the same skills in answering and dealing with questions in class, but without the visual clues, and it is very much the body language that is working in class in terms of how you answer a question. The words become at least a little bit secondary. In e-mail correspondence the words

are everything and you need to be very careful that you don't inadvertently say something that conveys a meaning that you didn't intend. (Prof. 002)

A third professor (Prof. 004) pointed out that while some new skills are needed in online courses, others are transferable and applicable to either classroom or online teaching: "There is a skill that works in both [the online and classroom setting], that is the ability to ask good questions. . . . Good questions that produce interesting, thoughtful answers" (Prof. 004). Although some professors believed that while the skills involved in asking questions are the same in both contexts, in online courses the ability to ask good questions may be more central to the teaching process. Online students have more time to think about the questions posed to them before they respond. For some students, this time to think and prepare a response gives them the confidence they need to answer questions—something they may not have done in a classroom setting.

Another example of how the instructional role of professors changes when teaching online relates to how the presentation of content changes. Professor 005 thought that while it was just as important that professors be competent in understanding their content area in both settings, if they teach the course online they need different presentation skills. Online, it is more important that professors are able to write lecture notes clearly than in a classroom situation. In the classroom situation, a professor is required to be able to explain course content on an ongoing basis. Professor 001 explained that she did not give as many examples or tell as many stories in her online teaching as she did in the classroom. She noted that, when teaching in class, examples and stories flow more readily from the exchange than they do when she is developing the course manual on her own:

If someone asks me something, if I think it a valid point, I may pass that answer to the whole group. But if someone does not ask it then I don't get the chance to offer an illustration. . . . You don't get prompted as much. There is not that same opportunity to really demonstrate in terms of my profession. . . . So, unless someone asks me a specific question and I get an opportunity to answer that, I can't tell them stories, which I would do in class. (Prof. 001)

Professor 002 noted that with online courses, he sets up a situation where students are discussing solutions to problems.

I monitor that [the discussion forum] and if things start to diverge from reasonable answers, then I am there to bring them back into line. If someone asks a question and no one seems to be responding, then I am there to provide guidance. (Prof. 002)

Professors felt their role was not as central in online courses as it was in face-to-face courses. One professor (Prof. 010) said that he is more of a facilitator in online courses because the content is provided and the professor interacts with students as they respond to it. The professor also pointed out that with the way the online course is structured, there is more interaction among students than between students and the professor. Professor 009 thought online teaching might cause professors to change their beliefs about their role in teaching:

When you are in cyberspace, it is almost as if there is no central pole. You are not standing up in front of the class anymore; everything is on the side. In the discussion forum you play less of a central role now; maybe that will begin to change instructors' beliefs about their role as instructors. (Prof. 009)

Professor 034 felt it took some adjusting to serving a less central role in the teaching process:

You realize that you are probably not as important as you thought you were (laughing). Not that you are unimportant, but classes will go on even if you are not there every day and there will be some good discussion, whereas, if you did not show up [to] a class on campus [the students] would all go home. (Prof. 034)

She has also found that online discussion can be more open as students “feel somewhat freer” in an online environment. For her, finding ways to take advantage of this and promote a high quality discussion were important.

Several other professors felt that online courses were being guided more by the availability of resources than by the professor. Professor 017 indicated that in online courses he was more inclined to “stand back and allow the resources to take charge.”

Professor 028 said that when teaching online she used more resources, especially resources that are online. If something is online and useful, she was more inclined to use it because the student can have easy access to it immediately. Professor 021 said that when she taught online, she felt “less engaged in teaching than when I am always in the classroom.” She was not sure if this was because she does not have to show up prepared at a certain place and time or if it was because the online courses she taught were so well developed.

Professor 024 reiterated that while the role of a professor may change when courses are placed online, the professor is still very important:

You need to encourage the student to do some work on their own now. So you are trying to provide them with the tools to do that and you need to hold their

attention So you will encourage them to read the material first and encourage them to analyze it. (Prof. 024)

These comments about professors' roles not being as central in online courses indicate that a significant change is taking place and professors are still in the process of understanding and adjusting to these changes. The skill of understanding the nature of the problems that students are experiencing based on the questions they ask and the comments they make is still very important in the context of online teaching. It is also important that a professor is able to take this information and develop a strategy to engage students to help each other.

The professors indicated that the professors' personality plays a significant role in how difficult it is for them to adjust to teaching online. Professor 009 thought professors teaching online should be more innovative and open to using technology. There might be "more possibilities" in online learning, as opposed to face-to-face learning, because of the cognitive tools that are available. She said there are "more interesting things" that can be done online. Further, she suggested learning cannot only be done "more efficiently" but also "more effectively as well." Professor 012 thought different personality types might be better suited to in-class or online teaching:

It depends a lot on personalities. There are people who teach who do not enjoy teaching in the sense that they don't like that part of it. They are very stiff and they are very formal and very intimidated in the classroom. [They are] very bright people and have wonderful ideas ... but I have watched them; I have watched graduate students ... absolutely go through torture. (Prof. 012)

He thought there were other people with personalities more suited to online teaching:

I think someone with less than an effusive personality would be deadly [online] once they got the parameters worked out. If you have the time and the inclination, [online teaching] can have its advantages. (Prof. 012)

In summary, this research uncovered that a number of professors were enthusiastic about teaching online while others found it restrictive. The role of personality and teaching style may be an important aspect of the role change required by individual professors.

The pre-planned nature of online courses was another significant factor in the role change required by professors. Two professors expressed the view that professors have less flexibility in online courses than in classroom courses. Professor 001 thought online courses were more reactive than classroom courses:

I think the emphasis on campus is more in your initial delivery of the material.

[Once] you deliver the material you will get a few e-mails. With the online course, you have got the material and you are not there to deliver it, so you are probably going to get more questions. So the emphasis, I think, is more on

answering questions online, whereas it is more on delivery on campus. (Prof. 001)

Professor 008 explained that because Web pages have been developed and course manuals circulated, it is more difficult to make changes once the course has started. In the classroom, he could decide to change the course “mid-stream” based on student reaction or other events.

Based on these comments, there is evidence that some professors are changing the way they plan for the courses they teach. They have to anticipate questions and issues, rather than just reacting to them as is common in a classroom situation. Conversely, there were other professors who made the point that professors’ roles online could be more

reactive. Professor 007 explained that she generally waited until most students had offered their comments before offering her own comments and building on those expressed by the class. Another professor (Prof. 018) went so far as to say professors responsible for online courses were not really teaching during the semester but were facilitating because “the teaching has already been done in the preparation of the materials.” She was concerned, however, that some professors were not doing adequate preparation as they moved courses to the online format:

Many professors tend to take all of their on-campus material and all their yellow dog-eared lecture notes and say, “Here you are, there you go” and tend to think that is an online course. . . . It [isn’t], the design and the approach . . . has to be very different in an online course. You can’t simply take your lecture notes and throw it up on the Web. (Prof. 018)

Another professor (Prof. 023) had a different view about the importance of content knowledge. He thought professors needed to be up-to-date and knowledgeable about the content because online students ask very direct questions and expect quick responses. This professor also mentioned that he had to be “a master of time management” and carry a laptop with him when he traveled so he could make use of any “down time” he might have.

The comments of these professors, in relation to the level of pre-planning and the reactive role of the professor, are significant in the context of the debate that has occurred in the scholarly literature concerning the impact of online courses on the role of professors. While some scholarly writers, such as David Noble (2001), see online courses

being taught by less skilled instructors, others predict a different circumstance developing where professors have to change the kind of work they do.

The importance of previous experience with technology and teaching at a distance to professors' decision-making processes was noted earlier in this chapter. The findings also show that previous teaching practice may be a factor in determining the nature of the change required by professors. One professor (Prof. 009) said her approach in the classroom was not really based on content. She used activities where students were given tools and resources to complete tasks. Through the process of completing these activities, students learned the subject matter. Also, she used more tools depending on the content of the course and the expected ability of students entering the course. This approach suits an online teaching environment. Conversely, Professor 012 said he found it difficult to switch from the classroom teaching mode:

That was the big difference for me; my head is still in a classroom situation. It just did not compute; [teaching] did not transfer well for me from that situation [the classroom] to this situation [the online environment]. [The online environment] was not very satisfactory from a point of view of any interaction. (Prof 012)

However, this professor did say he noticed some interesting things happening in the online course. For example, students tried to help each other with the technology.

Similarly, Professor 014 said students have more of an opportunity to participate, rather than just the professor providing all the answers, so they learn from each other:

Even though I do similar types of activities in-class as I would do online, the students participate more online than they will in the classroom. They will always

expect the faculty to default to the answer before the end of the session, whereas there is no defaulting in an online course; there is no one to answer. (Prof. 014)

She continued that online courses provide students with more opportunities to explore. Sometimes she would enter the discussion to elaborate on a point or suggest further readings that would enrich the discussion. She noted that she had not significantly changed her teaching method in class as she is a facilitative teacher but recognized that moving to online teaching would be “a much bigger leap” for other professors who do not have the same approach. Indeed, other professors echoed this view and furthered that experience teaching correspondence courses would make the transition easier.

Professor 001 thought that the role of the professor depended on the course. For some entry level courses he proposed the role of the professor is not as significant and the course is “a pre-packaged thing that could almost run itself.” However, higher level courses, he argued, would require more involvement on the part of the professor.

Another professor (Prof. 009) questioned how online courses have changed professors’ beliefs about their work:

So he teaches from home . . . well yes, that is a really big change, but it is not a significant difference. But if it changes the way he sees his role as an instructor by virtue that he is teaching online, it changes the way he relates to students. If it changes the way he sees the value of resources or whatever, then that is what is significant. So it is the beliefs and the perceptions about his work, rather than just his work [itself], that is important. (Prof. 009)

The role change a professor perceives is significant in that it provides insight into the complex individual decision process taking place.

Changes in the Nature of Class

The nature of the change perceived by individuals determines to some extent their willingness to undertake such change. When the medium of teaching changes so do the composition and the very “nature” of classes. The composition of the online class is different in that students typically have more work experience and are more likely to be living out of the province or in rural areas of the province. The altered class composition changes the nature of the class because the dynamics of discussion become different as the participants become more diverse. These changes are significant because they also influence professors’ perceptions of online courses in terms of compatibility and complexity. The findings presented in this section provide insight into how the nature of the class changes in an online environment.

Professor 019 explained that about 60 percent of the students in his online course lived within driving distance of either St. John’s or Corner Brook where they could take the same course in class. However, they had chosen to take the course online to add flexibility to their schedules. The other 40 percent were what he termed “genuine distance education students” who were “scattered all over.” Many of these students had started a degree at Memorial University and then moved. Taking courses online brought them closer to finishing their degree.

Many professors noted that, compared to in-class day time students, the students in online courses had more work experience and were bringing this experience to class interactions. In some fields of study, the students were more likely to be full-time, on campus students who chose to take an online course to provide more flexibility to their schedule. These students were very different from the part-time students. One professor

noted that the online students who were doing the course part-time were generally more mature and “a little bit more timely and responsible in terms of getting work in” (Prof. 003). Another professor suggested that these students were often busy and not able to fully share their perceptions and experiences with the class because of other demands on their time:

I get the feeling, as well, that these are also the students that are very pressed for time. This limits the amount of contribution they are able to make to the online course. So, whereas they may be in a position to make those additional contributions, it is difficult for them to do so because of the exact same reasons they are taking the online course. (Prof. 002)

However, some professors indicated that the mixture of full-time students and part-time mature students sometimes led to richer discussion in online courses. Some with work experience directly related to the content of the course, while others had no experience at all. One professor explained how this mixture created an environment in her course where fuller discussions were generated: “Online, every semester, I have had maybe two or three [mature students] who are incredibly articulate, very knowledgeable about the issues, well read, who do a lively discussion” (Prof. 007).

Professor 009 noted that students in outlying areas of the province may not have been included in class discussions in the past. Such students would have had to take drastic measures, sometimes including leaving their families and incurring significant expenses, to complete a program. This resulted in many potential students not participating:

It gives a broader experience to draw on. The students, the ones who are taking it distance, they are full-time working students [and] they tend to be more focused on the practical aspects of the course rather than the theoretical aspects. They tend, therefore, to bring in their experience. They are saying, “Well, this does not match up with what I am seeing day to day.” (Prof. 009)

Professor 019 observed that having students in various locations around the world can sometimes present “a fortuitous teaching opportunity”. One example of this was a professor who was teaching a course related to the Second World War. He had students located in Germany and France who could bring diverse insights to the class because of where they were and what they had seen. Conversely, the geographic dispersion of students in his online course was a problem for professor 011 when he attempted to set up real-time chat sessions. Given that the students in the course were located in various parts of the world, choosing a time convenient for everyone was problematic. Even within Canada there is a four and a half hour time difference from coast to coast.

Having students in different locations sometimes resulted in changes to the content of the course. Professor 031 explained that when he put his course online he had to reconfigure it to take people from outside the province into account. He did not use province-specific examples that people in other places might not understand. In some cases, these differences can be interesting issues for discussion. For example, when talking about recycling programs, students in different provinces might ask important questions such as: “Why don’t we have a blue box program in this province?” So, in some cases this professor felt geographic diversity leads to “a much richer variety of discussion.”

Several professors noted the different mixture of students in online courses created some interesting dynamics in class as each group of students had various expectations of the role of the professor and students. Younger students, for example, tended to be more used to class interactions, whereas older students who had not taken a course for a while expected more structure in the course. The difference in the age and expectations of the students sometimes caused friction within classes:

I have actually had a couple of incidents where one student would sort of chastise another one because they were criticizing things I had said. . . . To the kids who are used to the situation here on campus, my opinion is just one more opinion basically. They are much more in tune to challenging the professor and so forth, but a couple of the older ones thought that was terribly uppity. (Prof. 012)

Another positive outcome from having students dispersed geographically was that they could compare current practices across various regions in the discussion forum. For example, Professor 015, who taught in the healthcare field, found students would describe how different services were provided in their area. This led to a great deal of information sharing. Professor 028 concurred, pointing out that having students working in different fields added to the course:

Their different occupations do [add to discussion in class], because they will bring [different perspectives]. The social worker was coming at it from an institutional view and would say things like, “I work in a mental institution and these are things that are important for research here or I wouldn’t be able to do that with this patient population”. The guy who is in the health unit in Ontario will come on and talk about the jigs and reels he had to go through to be able to do research in

his health unit or what issues that were coming up in his unit. . . . They usually are all in health, but they are working in very different kinds of settings and their discussion of how they are dealing with settings makes it more interesting. (Prof. 028)

Another professor (Prof. 033) explained students from other locations can have a very positive impact on a course, especially if new dimensions of a course can be explored with the help of people from other areas. For example, one professor who dealt with the topic of cultural difference as part of the course she taught felt students from other areas have more experiences to bring to class on this topic than students from the province of Newfoundland and Labrador might. Professor 034 observed that the benefit of having students in dispersed locations is more evident in practical courses, but less so in more theoretical courses.

Professors noted that the application of learning to the workplace environment was much more immediate in online courses. One professor observed that the working students in the course he taught were immediately integrating what they had learned in the course to their work situation. For example, in the field of education, teachers accessed the course from their work site and the immediacy of connection of the learning to the workplace practice was much quicker than before. One professor (Prof. 043) in education reported that his students, who were mostly working teachers, were adapting concepts from his course into their own class and then, shortly after, reporting how it went to the rest of the students in the online course.

A professor (Prof. 022) in the business faculty also agreed that the mix of older and younger students often led to interesting discussions in class:

The student mix is generally very good for that and I have students every semester who can relate real life experiences—from trying to start a small business or running a small business in the past, or in a lot of cases still running a small business—so the support material within the student groups is excellent. (Prof. 022)

It is evident from the insight gained from this research that the nature of courses is different online compared to face-to-face. Taken together, the changing role of the professor and the changing nature of the class demonstrate important aspects of the nature of change required by individual professors. Next, other factors impacting professors' decisions to adopt online courses will be presented.

Other Factors Impacting Professors' Decisions

In addition to the changes in the role of the professor and changes in the nature of the class, two other factors that impacted professors' decisions emerged from the data: job satisfaction and the impact on professors' time. These themes will be elaborated in the following sections.

Job Satisfaction

For many professors, an important factor when deciding to teach or continue to teach online courses was how they perceived it may impact their job satisfaction. Some professors enjoyed online teaching but would prefer not to teach all courses that way. One of the negative impacts on job satisfaction cited by online professors was the limited personal interaction with students. Many professors felt isolated and missed the informal contact with students that results from teaching in-class. Other professors identified beneficial aspects of teaching online—namely the challenge of undertaking something

new and the satisfaction of creating a learning activity for students. Some professors noted that job satisfaction is changing even in classroom courses. The issue of job fulfilment fits into Rogers (2003) model in that it is one factor in how professors form perceptions of this innovation. Also, given the comments by authors such as Noble (2001) about how online courses would impact on professors' job satisfaction, the findings of this research on that topic are particularly important.

Many professors preferred teaching online to in-class. One professor (Prof. 001) submitted that online courses were more enjoyable due to the small number of students, which allowed for greater sharing and connection. This professor felt the in-class venue does not allow much contact with students:

A lot of students on campus won't come up and talk to you anymore; they will e-mail you. . . . I could go all semester and not meet anybody but have four or five e-mails from them; which is not different from online. (Prof. 001)

One professor (Prof. 027) noted that the development of teaching relationships online is different from in-class. She said more of an effort is needed to encourage interaction with other students, but "once it is started, it is solid." In addition, this professor observed that in a classroom students "talk to you as the professor," whereas in the online forum it is easy to broaden that by asking, "Well, what do the rest of you think?" Indeed, another professor (Prof. 014) liked to teach online more than in-class because of increased participation by students:

I find that the students participate more in the course [online]. If they come to class they still expect the sage on the stage and I don't like teaching that way. . . . Students have longer to explore [online]. I will pop in with some things to say on

this particular issue which needs a little bit more elaboration—“Why don’t you look at such and such articles?”—and then we will build on it from there. It just seems to work. (Prof. 014)

Several professors did not agree with the idea that online courses lead to feelings of isolation. While recognizing that there are some students, such as foreign students, who would prefer classroom interaction, one participant (Prof. 009) maintained that equally as much contact can be established in an online course as in the classroom. In the online class, students were more inclined to contact professors any time, whereas in a classroom setting they often restricted themselves to the five minutes at the end of class. In terms of job satisfaction, this professor felt teaching online improved her performance as she could better structure and organize the course.

Another professor (Prof. 017), noted that when students have to conform to classroom schedules it does not always engender the best kind of learning environment.

He explained that when students are able to do work at their own pace, a more flexible and rewarding interaction is established:

It is more satisfying for me to teach online because I don’t have to deal so much with other factors where students are tired. They are working all day and when they come into the classroom they are just beat out. I don’t want to see that. I don’t want to have to try and keep their attention like Grade 2s or something.
(Prof. 017)

It is evident from these comments that some professors assess job satisfaction, at least partly, based on how they perceive their own ability to teach effectively. Overall, they saw online courses as more gratifying because they saw many benefits from this medium.

While many professors enjoyed teaching online they also made it clear they did not want to teach all their courses online. Some professors liked to balance teaching in-class and online courses because they enjoyed the interaction and theoretical discussion with the younger students who tended to be in the in-class courses. One professor (Prof. 002), while recognizing the need for some courses to be offered online, stated he would not want to teach all of his classes in that format. Face-to-face contact with students was deemed a beneficial aspect of his employment:

That is part of the reason why I got into teaching—the face-to-face contact. I enjoy spending time in front of the classroom, if I didn't I would not be here. Do I want to replace all of my classroom teaching with online courses? It is not going to happen. I won't do it. If I were forced to do that I would leave, I would go somewhere else. [Offering online courses] is a valuable service that we provide to the students but it is not, in and of itself, why I am here. (Prof. 002)

Professor 004 also stated that, while she likes to combine in-class and online teaching, she would not like to teach all her courses online. The autonomy to be able to travel was a large incentive for her teaching online because St. John's does not tend to offer the many things she would like to do. However, she also enjoyed the personal contact with students that results from face-to-face teaching. A professor (Prof. 019) who had in the past taught all his courses by correspondence found this arrangement to be isolating, whereas he really enjoyed classroom teaching:

I will often walk out of the classroom feeling like that was a good class. I will often walk out feeling, "Boy I had fun" and "Gee, the students really did respond to that" and "That was a good job". I often come out of the classroom feeling like

I could happily spend the rest of my life doing this. I like teaching. . . . With the online and correspondence [courses] you don't get the same excitement and the same rush from having a class go well and the students respond. (Prof. 019)

Another professor (Prof. 031) indicated he would rather teach in-class but he considered online courses to be an improvement over correspondence:

I like teaching and part of it is the performance. For me, the most natural thing to do is to stand up in front of a group of students, because they are with you, a shared experience. Correspondence is really bad because you never get to really come across to the students at all. Online is not so bad; you never meet them but you feel you know them because you have been corresponding with them by e-mail or you see their notes on the Web forum. So, I mean, there are some

significant advantages [for online courses over correspondence]. (Prof. 031)

This insight into how professors prefer the flexibility to mix courses is important from the point of view of trailability, as well. One of the characteristics of an innovation, which determines its rate of adoption, according to Rogers (2003) is trailability. It is evident from this information that trailability, or the ease with which adopters can try a new innovation, rates very high in the case of online courses. Added to this is the flexibility for professors only to partly adopt if they prefer; and, as is the case with most professors in this study, they can teach both online and in-class. The comments here indicate that if the innovation or implementation of it restricted trailability, the adoption rate of online courses would be significantly lower.

Another factor related to job satisfaction that emerged from the findings was the amount of direct contact with students. Some professors noted that they did not get a

chance to know the students online and, because of this, courses were isolating. Indeed, some professors preferred not to teach online courses because of the limited contact with students:

Much more satisfaction comes in-class because you can then read the students, how they feel, and you can tell from looking at them, the reaction, whether they understand and how they feel about this and that. You can address a problem or a concern that they have, questions that they have when they arise. . . . That is where a lot of the satisfaction in teaching comes [from]. (Prof. 005)

This professor observed that many of these same things cannot be achieved in an online course. In fact, very few student comments were generated in his online course and he found often they were more critical in nature than those in class.

Professor 011 remarked that while he has become comfortable with teaching online, greater fulfilment comes from teaching in-class. The level of personal contact online is reduced compared to in-class:

I don't think I have the same ... professional contacts. People now tell me they have taken courses from me and I don't even know who they are. So I could be passing someone in the supermarket and for all I know they could have been a student of mine. I would never know it. Whereas in the past,...you would be in a shopping mall and certain people would come over and shake your hand and say, "Hi, how are you doing?" ... You become a little more cloistered [with online courses]. (Prof. 011)

The same professor also acknowledged the difficulty for working students to take night classes, but noted how personally demoralizing it was for him trying to engage tired students in the evening.

Professor 024 noted that the lack of a close relationship, inherent in online courses, has had an impact on the institution's programs. Relationships, which have been built up with in-class students over the duration of the program continue after they leave. These former students assist in support-related activities such as student placements, industry connections and sometimes make donations to the institutions they attended. This relationship is not as strong with the students in online courses and this could impact on their willingness to help the institution in the future. Professor 028, who noted that she missed the close informal contact she had with in-class students, put it this way:

I like to see their faces. . . . They don't stop by the office and say, "I have got a new project I'm doing over there. What do you think about this?" And that has always been part of my own teaching so I miss that. (Prof. 028)

This professor thought one option for building stronger relationships might be to include a residency option within programs. She was aware of programs at other universities where students are brought together for a week or two during the summer. This, she thought, would help overcome the feeling of "being isolated." Professor 033 lamented the fact that she could not generate the same level of interaction in an online course as in-class:

I taught it in the classroom; it was very interesting; it was very interactive. The students did their own presentation and there was a whole lot of interaction. It was a lovely course. I must say, everybody seemed to like it and I couldn't achieve

that online. I just couldn't achieve the same level of interaction online with that particular course. (Prof. 033)

Professor 022 stated he enjoyed both types of teaching for different reasons. The in-class contact with younger students was enjoyable since the questions asked were more theoretical, whereas the groups in online courses were more experienced and the conversation more interesting because of their practical insights.

Professors identified things they liked about teaching online. Some professors found the ability to explore new teaching options rewarding. Professor 015 explained that while she gets more satisfaction teaching in-class, online teaching has some interesting characteristics as well. The novelty of using new technology was especially attractive.

Furthermore, online courses appeared to be more satisfying for the professor when students are mature. Another professor (Prof. 021) expressed mixed feelings about online courses and her job satisfaction. While she enjoyed using the new technology and exploring new teaching options available to her, she missed the flexibility of being able to change the course on a day-to-day basis. Ultimately, online courses could be changed; yet, lack of spontaneity was seen as a negative aspect of this mode of teaching.

For some professors, the added flexibility with their time in online courses was viewed as a major advantage. Professor 023 appreciated his more adjustable schedule when he taught online:

I love teaching; I love standing up in front of the class and facilitating learning; I love the entertainment value of doing that. I love the feedback, watching the reaction of the class, fueling discussion, fueling arguments. I love that interaction ...that is gone in online learning. But at the same time, doing an online course and

being free from having to show up and teach at certain times. . . . Having better control over your time allows me to do other stuff which I don't think I would have the opportunity to do otherwise. It allows me to do research; it allows me to do my writing. (Prof. 023)

These comments are integral in helping us understand how some professors develop the concept of relative advantage and how this, ultimately, impacts their overall perception of online courses.

Some of the professors' comments reveal that their perceptions of online courses were still in the process of being formed. Several professors explained they had grown to like online courses. One professor (Prof. 007) explained that she did not like teaching this way at first, but she now takes more pleasure from this option:

I love teaching on campus. I just like teaching. I like the in-class experience. I don't think you can duplicate in-class experience; I really don't think that you can. The online option is a much better option than the correspondence option, definitely, because people get to interact on these questions and so on. I'm glad I'm teaching online, as opposed to a correspondence course. They both certainly have their good points. For some people the online course is the best possible [option]. (Prof. 007)

While teaching online was "definitely different" for this professor, she had been able to "develop some interesting relationships with students online." One of the factors she thought was missing online as compared to in-class was the decreasing level of personal information about students that professors are afforded. For example, on-campus professors would notice if someone was missing for a few days or if someone was not

looking well. Through informal conversation, professors have the opportunity to find out about what is transpiring in students' lives and what they are interested in. She also pointed out that some students participate more online than in class and facilitating such discussion was satisfying:

I have had [some students] in both settings. [There are] people who have come up with some really insightful comments online and I have been in class and I don't know what their voice sounds like. I'm wondering why this intelligent person who is doing the readings—I can see it online, but I don't see it in an on-campus course because they are shy in that setting—won't talk for one reason or another.
(Prof. 007)

It is also notable that professors found new ways to augment their satisfaction online. Several professors mentioned that in online courses much of the satisfaction comes from setting up a learning environment and maintaining it properly. One professor (Prof. 003) explained that he worked hard to meet the needs of his online students. For example, he felt it is very important to get in the habit of promptly replying to students. In dealing with any student problems, he is available to meet with those in the St. John's area or to set up a phone call to deal with students who live farther away. He learned that by being available and responsive to online students, his rapport with them is almost equivalent to that which he has with in-class students.

Professor 020 assessed the satisfaction he / she derived from both methods of teaching as being the same:

For any of us who teach, you are always looking for the 'a-ha' that the student gets and ... in a way, with the online course you see it because you see it written.

... To me that is what you are really looking for: to see them grow and develop and seeing them say, 'Well, I never thought about it in this way before.' So, for the educator in us ... it is the jollies. It is not you telling them, it is them exploring it. For me, that is the value of it, to see them talking back and forth. (Prof. 020)

Professor 029 said the main value in teaching for him was student performance:

"If the students are doing well, then I'm happy because they are learning something".

However, he noted that his records show that students in his online courses do not do as well as those in-classes. Professor 034 said she found equal value in teaching in-class and online. In both formats she appreciated the eager learners, as well as the challenging questions they ask. Professor 008 made the point that while it does not compare to the classroom experience, setting up an online learning activity does provide positive reinforcement. Yet, other than the 10 to 20 percent of the class who normally converse through e-mail, he found very little feedback from students:

They are invisible and so you don't get that student interaction satisfaction the same as you do in the day classes. You get a little bit of it from the ones who are very close, but it is not the same. (Prof. 008)

Professor 018 whose preference was teaching online explained that in online courses a greater level of structure was prevalent. Interestingly, this has led to her being more structured in her approach to classroom courses.

The professors' perceptions about online courses were not made in the context of a stable environment. Professor 010 made the point that classroom courses are also changing. He explained that he has had limited interaction in classroom courses and he feared this may become more commonplace. This professor cited the example of a face-

to-face course where he invited students to the graduate students' cafeteria area to sit and chat after class. He found that very few students were interested in doing this type of activity, likely because they are pressed for time:

They tend to have families and they tend to have jobs, and they have busy lives so they don't have the time. They have just got that three-hour period blocked off and then they have got to baby sit or others have got work to do, other than course work. So that hasn't made a difference and that is balanced off against the more intensive discussions you can get into, if someone wants to, online and really get more in-depth on a subject. (Prof. 010)

This professor explained he also makes a special effort to connect with students in the online courses. Typically, he exchanges information informally with these students about where they live or where they work. This leads to his statement that he “actually got to know the people online better.” These comments reinforce that professors' satisfaction is an important component of how they perceive online courses.

This section has provided insight into how various aspects of online courses impact professors' job satisfaction and how this is linked to their decision to adopt online courses. This research highlights the emotional aspects of teaching and how this relates to teacher satisfaction. It also indicates that the critical relationship between students and professors are very important in professors' enjoyment of teaching online. Many professors were concerned with how their relationship with students would change as courses went online.

Professors' Time

A highly influential consideration for many professors was the time required to teach an online course. The general view was that online courses are more time consuming than in-class courses. In fact, a majority of professors submitted that online courses took not only more time but considerably more time. They identified many time taxing duties, including course development, the need for "constant" monitoring, and the huge number of e-mail messages that had to be read and responded to. Other perceptions related to time were the loss of control of time and the tendency toward the blending of work and leisure time. Time issues were usually assessed in terms of comparisons with classroom teaching or other forms of distance education. This exploration of time and related issues provides further insight into professors' perceptions of online courses and their individual decisions to adopt this relatively new way of teaching.

Professors cited many reasons for the time challenges associated with online courses. These included increased time for course development, the constant obligation of the course, and responding to e-mail and the discussion forum. Some professors indicated that development and preparation time was much longer for an online course. One professor (Prof. 002) reasoned that it takes two or three times longer since you have to anticipate the questions without knowing much about the students. Similarly, another professor (Prof. 006) predicted it takes approximately triple the time it does to develop a classroom course. He further explained:

I usually say, 'take a year's lead time.' Even if you have a course you have been offering for 20 years on campus that is totally different from what you will have

for an effective online course. Some professors are just turning them over, but I don't think they are effective. (Prof. 006)

Another professor (Prof. 011) also estimated that it took triple the time to teach an online course. However, he attributed it largely to the current limitations of technology to convey the class content:

[The increased time required] is probably because you can't show [the students] things or you can't pass things around. It is just a little more difficult to convey content. All we are dealing with really is a two-dimensional format. You don't see the person; all you can see is the screen. That is only two dimensions. You can't smell or hear. There are a whole bunch of dimensions that we have lost when we walk out of the classroom. (Prof. 011)

Professor 009 explained why she spent a lot more time working on the design of online courses than classroom courses: While in classroom courses "you are flying more on the seat of your pants," in online courses you have to have even the minor details arranged in advance. Another professor (Prof. 027) provided the following insight as to why online courses require more preparation time, especially the first time they are offered:

It is very public, so you don't want it to have grammatical mistakes. You want to make sure you are using appropriate examples and so on and so forth, whereas preparing a normal class, a seminar or lecture class, you can write up your notes in note form rather than in prose. (Prof. 027)

Other professors (Prof. 018 and 042) noted online courses may be better structured because of the advanced planning that they require.

Several professors talked about the “constant obligation” they felt to monitor the online courses. This was one factor that contributed to the perception that these courses involve more work than does in-class courses, and in most cases significantly more work.. One professor (Prof. 001) said he felt the constant need to be checking the Website to see if someone had posted something:

I always feel I have an ongoing obligation. On campus you are physically there and they have an opportunity to see you; with this [online course] you don’t know exactly when they want to see you or contact you. (Prof. 001)

One professor (Prof. 034) noted that since students post messages at different times, the work in an online course is more pervasive than in a classroom course. She said that time allocation has to be carefully planned or else you could spend much more time

responding to students in an online course. Another professor (Prof. 006) explained he had kept a log of the time he spent on both in-class and online courses and he found he spent four to five times as much time in the online course. He estimated that to teach an effective online course you have to go online “a minimum of five times a day”. While explaining he has certain areas of his course where the interaction is more informal and the purpose is to create a “community of learners,” he emphasized that forming relationships online takes triple the time as in class. He went as far as to say that if professors are not willing to make this kind of time commitment they should not offer an online course.

Many professors identified reading and answering e-mails from students to be the most time consuming aspects of offering an online course. Professor 042 explained that

the “constant” reading and responding to e-mail messages took a significant portion of her time:

I have got a lot of e-mails that I have got to respond to because the students will contact you individually by e-mail if they have questions about any aspect of the course and sometimes there are telephone messages too. So there is still a fair bit of work and it looks like you have got all the time in the world because your week is not booked out with class time. (Prof. 042)

Professor 012 actually changed his approach to contend with the large volume of e-mail he received in the course:

It is a ... heavy load from a teaching point of view; I mean it is enormously time consuming. What happens is that students figure because you are accessible, then you are available 24 hours a day. ... I got to the point where I said, “I am not answering anymore e-mails. If you have got a comment put it up on the site and I will address your comment and then everyone can have a smack at it.”... Personal stuff is different; if you are having a problem, fine. E-mail me. (Prof. 012)

This professor also highlighted the problem of reading a large number of e-mail messages off the screen. Eventually, he started to print his messages so he could read them. He also felt compelled to correct the students’ grammatical mistakes in the postings, which again infringed on his time because there was so much text in the course. This professor recognized he was still teaching with a classroom mind-set and speculated that after teaching this way a few times he might change his practice. Professor 024 also concurred that extra time was involved since you have to write every word rather than discuss it verbally.

Professors also stressed the time consuming aspect of the discussion forum. One professor (Prof. 027) reported she was able to provide more individualized attention to students in online courses. She explained that in classroom courses there is only the 10 minutes after class where students can come up and talk with you. The students enrolled in night courses do not have the time to visit your office or stay around for longer. Online, time is less limited and more time can be spent discussing individual or group interests. Other professors were more wary of spending “too much” of their time with students. Professor 019 noticed that the discussion forum could take as much of his time as he could give”:

The discussion forum ... is really elastic. [The amount of time] that could suck up depending on how much time I want to spend thinking about the students’

postings, how many replies I want to make, the length of the reply. I could spend five hours a week keeping up on the discussion forum, or 15, or 40; I could spend 40 hours a week on that if I chose to. (Prof. 019)

With a class of 60 students, this professor spent at least an hour a day responding to e-mail messages from students. He estimated he spends about ten hours a week on the online course, as opposed to three hours a week for the same course in the classroom.

Another professor (Prof. 028), while aware of strategies such as responding to the class as a whole rather than each individual student, found it difficult to break the pattern of responding to individual students. He too found that the online course demands more time to teach than an in-class course.

For professor 031, online courses took more time for a “variety of reasons,” but the main reason involved getting “much more interaction with students.” He discovered

that 40 to 50 students are perhaps the most a professor can handle in an online course; yet he has had more in both classroom and correspondence courses. This educator thinks breaking big classes down into sections, the way the British Open University does, would make large classes more manageable. Professor 033 found she could generate more “intense” interactions with students in the online course, but her strategy included daily responses to e-mails and longer preparation time to ensure that the best use of the technology available was being employed. Professor 008 also concluded that online courses “take a lot more time.” He explained that about 20% of the students in an online course feel they have to ask at least one question a day and this takes time to deal with. Furthermore, since the medium is so new, many professors are still on a learning curve, which involves many more hours each day. Generally, it takes professors time to explore the options that are available to them when teaching this way.

Professor 015 observed that there are a number of factors that determine how much time is needed to teach online. In some courses, extensive discussions are unavoidable, while in others very little discussion takes place. Also, strategies can be put in place to encourage or limit a student’s participation in a course. Another professor (Prof. 014) noted that the amount of time spent on an online course can be influenced by factors such as the professor’s approach and the structure of the course:

It can depend on the amount of discussion you have in the course and ... the amount of control you are willing to let go. If you are willing to allow the students to take responsibility for their own learning and critique each others’ responses and those sorts of things it doesn’t have to be as time consuming as it is for some people. However, I think that is a real control issue. [Some professors] feel if they

have not responded to each individual discussion forum, then they haven't done their job. If faculty are putting in a lot of discussion forums it can be a tremendous amount of work. (Prof. 014)

There are indications that university administrators, as well as individual professors, are still coming to terms with changes instigated by the presence of online courses. Professors contended that the workload and the number of students in online courses is a major issue. They also noticed that as professors become more experienced in this format, they develop strategies to help mitigate the workload problems. These insights are of such significance to the working lives of many professors that they have the potential to be a major issue, which could ultimately have an impact on their adoption of online courses.

Another point emerging in relation to time factors is the issue of professors losing control of their work schedule. Several professors made the point that although online courses allowed more flexibility with their time they also led to a loss of control of scheduling their work time. Professor 002 felt compelled to check the discussion forum at least once every day, yet it is never predictable how long the process will take. That task could take anywhere from five minutes to two or three hours, so time management can be a big issue. Professor 005 explained it is more difficult for him to manage his time because of the number of e-mail messages he receives as well as the expectation of an instantaneous reply:

The designers of WebCT, the designers of the online programs, seem to think that as an instructor this is the only thing you have to do—sit here and enter responses and deal with student requests on a continuous, ongoing basis—and that is just not

the case. . . . There is a constant flow of e-mails and postings and so on from all over the place and an expectation of an instantaneous reply. (Prof. 005)

Professor 006 explained that while some educators like to go online only once or twice a day, he preferred to do smaller amounts of work five to seven times a day.

Another professor (Prof. 034) noted that online students sometimes go a while without posting and then try to “catch-up” by posting on topics that were discussed in previous weeks. Professor 041 preferred to work at night and have his days free, so online courses suited him as they allowed him this flexibility. While her time is more flexible than in the past, another professor (Prof. 042) explained that her schedule soon becomes filled with other things:

Well, of course, my time from Monday to Friday when I am doing online courses is very flexible on paper, but there is a lot of work and it has got to get done sometime. It is really easy, if you are not careful, to get it so crowded with meetings that then you end up working on your course late at night at home. So it is a blessing, but it is also a disadvantage. (Prof. 042)

Professor 001 also stressed the increase of evening and weekend work involved with online education:

I am a fairly accessible person, so for me it is not a really big change. With online courses you are working different hours ... where there are no class times, it is all the time. (Prof. 001)

These comments indicate that compared with previous classroom practice, online courses require a significant change in practice by professors.

Another theme that emerged from this research in relation to professors' time was the way online courses led to a blending of work and leisure time. A number of professors either spent a considerable portion of their traditional leisure time completing course related work or developed strategies to counter this trend. One strategy used by professors was to refuse to do work in off hours. Professor 002 said he deliberately limits his e-mail access at home so he is not working excessively from home. He indicated he provides a phone number for students to reach him, though it is rare that they do. Another professor (Prof. 003) also explained that he deliberately limits his access to the course from home:

I don't do any work by computer at home. I don't have my e-mail account sent home, I just don't do it. I will bring home material if I'm working. I will bring

correcting home, but I won't bring the computer home. There is a tendency that it could take over too much of my leisure time. (Prof. 003)

Professor 004 also "refuses" to do work on the course at home in the evenings. She explained that while she is aware that most students do their course work at night, she prefers to work during the day. The teaching she does online is her core teaching and she does not want to "squeeze it into the corners." Rather, she thinks it should "take prime time" in her workday. Professor 024 did not answer e-mail messages on the weekend but had a policy of answering within 24 hours of a business day. Another professor (Prof. 042) said she initially tried to limit her work at home by not having high-speed Internet access. However, eventually, she did get high-speed access and found herself doing a significant amount of work at home.

Many professors explained that they often do work in off time. Professor 008, for example, explained that many students work on their courses in the evening and this becomes the normal time to send e-mail. While he always has the option of dealing with these messages in the morning, he said that “it is not unusual for me to be sending messages [at] 12 o’clock at night”. Several other professors also indicated they checked e-mail messages in the evening and on weekends as that was when most students worked on the course:

You have to be there on Saturday and Sunday, I find. I feel I have to check in on Saturday and Sunday and I feel I have to check in sometimes in the evenings. I know that the students who are taking these courses ... are taking them ... because they have jobs or ... other lives beyond their lives as students and

therefore during the typical daytime hours they are not available. (Prof. 009)

Professor 010 also said most of the work for the online course was done at night.

Another professor (Prof. 011) said he is “always” teaching the course, from when it begins until a couple of weeks after the course is completed. Professor 015 explained that she attempts to keep on top of tasks by responding every day as situations arise. She found a majority of students post things on the weekend so she usually works Sunday afternoons to get a head start on answering her e-mail.

Another professor (Prof. 023) said he checks the course from home and has a laptop he uses when he travels. When asked if there was a blending of his leisure time and work time, he responded that, “there is no escaping it.” Professor 034 also found she often does work in the evening for her course:

I do a lot late in the evening. What I find is that it is really difficult to deal with the discussion group on work time, unless it is after hours and everybody has left the building. . . . People will come and knock on the door; they don't recognize that you are teaching; they just see you on your computer so they knock on the door and ask you if you are busy, whereas if you are teaching in class you don't get a knock on the door asking you if you are busy. There are lots of interruptions like that and I found it was just too disruptive. I like to take a chunk of time and deal with the discussion forum, so I do tend to do that in the evenings at home.

(Prof. 034)

A blending of work and leisure time was a problem for Professor 021 even before she started to teach an online course. This professor noted that, just as classroom courses force students to focus and keep up with course material, it also forces professors to do the same. She explained:

What is different is that having a class forces you to be in a certain place with a certain level of preparation; what is happening now, because I don't have that structure, I get caught up in my research projects. So, sometimes the students and the courses get lost because I can answer my e-mails whenever I want to. (Prof. 021)

In this section, findings related to professors' concerns about time management issues were presented. The importance of this factor in individuals' decisions to adopt online courses was demonstrated. Overall, these comments indicate that some of the problems may be of a transitional nature as professors come to terms with teaching in this manner. Several professors noted they were developing strategies to deal with the time

issues they faced. However, the fact that it was noted as a significant concern by so many professors indicates that strategies will need to be developed to deal with it.

Summary

The findings presented in this chapter relate to the third research question and the individual factors that affect the adoption of asynchronous online courses by university professors. By providing insight into various factors impacting individual professors this research expands knowledge in this area and provides the evidence needed to make further contributions to the advancement of both practical and theoretical knowledge valuable in this field (see Table 4). The findings in this chapter cover material related to the changing role of the professor, the changing nature of the class, job satisfaction, professors' time, how professors came to teach online courses, and how their attitudes have changed towards teaching online.

This research provides beneficial insight into the innovation-decision making process of professors at Memorial University of Newfoundland. While some of the professors had been asked by administration to teach online courses, most of them had taken the initiative to do so on their own. Their decision had been based on either their personal interest in the technology or because they saw a need among students to have these courses offered online. Other factors, such as experience teaching at a distance or using information and communication technology, also impacted their innovation-decision process. The data suggest that the decision-making process is different for those with distance education experience and differing levels of technical ability. Many online professors had some experience with technology or teaching at a distance, which they felt made the transition to online teaching easier for them. Overall, the experience of the

online professors ranged from technology enthusiasts to those with only basic skill levels and limited know-how.

Other important observations were made about the innovation-decision process. It was noted that once professors had taught an online course their impression of this teaching format usually improved. Another point was that some professors contended that their route to teaching an online course did not involve an adoption process. While they thought some professors may have adopted the basic structure of the innovation, they were different and felt that through their creativity and input they had shaped a better product. They believed that by using various tools they had evolved something more dynamic out of the technology that was available. As professors talked about the need for “hands on” training, differences between theoretical and “how-to” knowledge was mentioned; the need for “time to fool around with it,” in order to learn appropriate technical skills was another point that came up.

The research reveals factors that affect adoption that are related to the compatibility of online courses with the professors’ previous teaching practice. Examples of the changing role of professors when teaching online include the need for different skills, the need for more pre-planning while still being reactive, and the shift away from the professors’ role as being central to the learning. Some professors made the point that the skills they utilized to generate discussion in class were similar to the skills they used in online teaching. For example, the ability to ask good questions and direct the discussion online is similar to that used in a classroom. Some professors thought the amount of change required might depend on their past teaching practices; professors who had taught correspondence classes found the transition to teaching online easier. Not only

does the role of the professor change when teaching online, but the very nature of the class changes as well. Because of the increased accessibility to the course, the composition of class alters in significant ways, which subsequently results in a change in the discussion occurring in the course. Since students in online courses are generally older and have more work experience, the discussion in class takes on a more practical, rather than theoretical, nature. Furthermore, the increased diversity of the students often added to the discussion that occurs in the course.

In this research, professors were asked how their teaching satisfaction was impacted when teaching online courses. While some professors preferred to teach online, many said they found classroom teaching to be more fulfilling because of the more direct contact with students and the ability to visually gauge students' reactions. While some professors recognized the importance of offering online courses and were pleased knowing they had met that need, they did not want to teach every course in an online format. Some professors found online teaching to be "isolating" since it prevented them from really getting to know the students.

The time it takes to teach an online course is a major issue in terms of how professors perceive online courses. Most professors expressed the view that online courses took considerably more time to teach than classroom courses. They identified reasons why online courses were more time consuming, including course development, the constant nature of the obligation, responding to e-mail, as well as managing the discussion forums. Despite indications that some professors were developing strategies to address these issues, it was still a widely held view among professors that online courses required substantially more time. Other time-related issues involved the pacing of the

courses and their impact on the professors' other work. While many professors appreciated the flexibility of teaching online, it was offset by a loss of control of their work schedule. Rather than setting the pace for the course, they often found themselves responding to students' timeframes, which involved responding to messages late at night or on weekends. They would then find their regular work day filled with other tasks.

This research provides rich insight into the innovation-decision process of individual professors, as well as factors that influence individual professors' decisions to adopt. It highlights the various nuances of this innovation in the context of professors at Memorial University. In other environments it might be possible to impose an innovation and demand compliance to certain standards of usage. It became clear from this study that such an approach would cause difficulty in this sort of environment. Also, for this particular adoption group, a number of people were pushing the innovations forward themselves and, in some cases, wanting to do so faster than the administration. The continually evolving nature of the innovation itself also has an impact on the innovation-decision process, as professors continue to use the innovation. This and the preceding two chapters presented the findings from this research in relation to the three levels of analysis that were outlined in the conceptual framework for this study: societal, institutional, and individual. The next chapter draws together these three levels of analysis and provides further analysis and discussion of the implications of these findings.

CHAPTER 7

CONCLUSION

In this chapter, a discussion of the findings will be undertaken and the implications of these findings will be explored. Suggestions for further research will also be advanced. The focus in this chapter is on answering the primary research question: How do various factors impact the adoption of asynchronous online courses by university professors? The findings from this research will be presented using the conceptual framework presented in Figure 3 as a guide for analysis. Findings related to the three sub-questions and the three levels of analysis are used as a basis of analysis.

Discussion

The purpose of this research was to understand the adoption of asynchronous online courses by professors at Memorial University of Newfoundland. Through examining the situation with professors at this one university insight was gained that was helpful in theory development, dealing with practical matters, and identifying items needing further research. The research provided insight into many previously unexplored areas. The findings were organized to answer the research questions related to the three interconnected levels of analysis presented in the conceptual framework: societal, institutional, and individual.

A number of factors related to societal issues emerged from the literature review: perceptions of relevant social groups, the interaction of political factors and nonhuman actors, technical momentum of existing technology, and the economic model used. It was Bijker (1995) who emphasized the importance of the “perceptions of relevant social groups” in the adoption of technology. He proposed that the concepts of relevant social

groups, interpretative flexibility, technological frames, and the use of power interact to make change a social process. Relevant social groups influence the development of a technology and determine how it is interpreted and, through interactions, determine if or how it stabilizes. As well, others, such as Lindsay (2005), have demonstrated how user groups can configure technology quite differently from what the developers or marketers originally intended. Both the social constructivist theorists, such as Bijker (1995), and those who have focused on innovation, such as Rogers (2003), have recognized the importance of the way relevant social groups perceive an innovation. Indeed, in the context of this research, it was apparent that the perceptions of relevant social groups — that is, professors, students, and others — played a role in shaping the development and use of online technology. In terms of Rogers' (2003) theoretical perspective, these individuals' perceptions are important as they influence professors' decisions whether to continue teaching online, as well as the views of others with whom they discuss possible adoption.

This research provides insight into the various reasons why professors adopt the use of online courses. Many of the adopters had serious concerns about the use of online courses. They often weighed the advantages and disadvantages of offering online courses. In some cases they came to teach courses online as a result of power relations and compromises they made between various aspects of their personal work environment. Although in other cases, particularly among the early adopters, professors were very enthusiastic about this new technology. Factors such as subject area taught, employment status, and technical ability also impacted the innovation decision-making process. This research highlights the complexity of professors as a relevant social group.

In terms of students, this research challenges some of the assertions that have been made in relation to the nature of students and their use of technology. For example, Prensky (2001) argued that the education system has not kept up with changes that are happening within the broader societal context. Further, he stated that students are well versed in the use of information and communication technology. However, the findings of this study indicate that students who take online courses are a diverse group and in many cases less technically savvy than Prensky would lead us to believe. In fact, the research conducted for this study shows students had widely varying levels of technical expertise and some students did not like online courses. This research also reveals that there are other relevant social groups, such as administrators and support staff at the university, whose roles have not been fully explored.

As many researchers have demonstrated, physical infrastructure or technological systems often have political values embedded in them (Callon, 1989; Epstein, 2005; Law, 1989; Rose & Blume, 2005; Winner, 1985). In the case of the education system, the kind of infrastructure invested in by governments in many ways determines who can access publicly funded educational opportunities. According to Bijker (1995), the realization that there are political dimensions to decisions related to the use of technology is the first step to reconnecting the political and technical aspects in a way that encourages public involvement in the shaping of technology. This study documents ways that political factors and nonhumans actors were important in the adoption of online courses at Memorial University. For example, difficulty accessing educational opportunities was not only a major issue for students living in rural areas but also for many students who lived near campus and had work, family, or other commitments. Another significant political

change was that power structures at the university were changing and professors were losing some of their autonomy and being “coerced” into teaching online. This research provides evidence to support the theoretical assertions made by Bijker (1995), Hughes (2005), and Winner (1985) that technologies have a political dimensions. Further, it highlights some of the political factors related to the adoption of online courses.

Several authors have discussed the concept of technical momentum and the idea that an existing technology influences how new technologies develop and are used (Hughes, 2005; Kline, 2005). The findings from this research illustrate how the dominant medium for offering educational opportunities —the classroom —has a momentum within society that impacts the adoption of online courses. Findings related to two indicators of technological momentum and existing technology were explored in this research: (1) professors’ views on the future of university teaching and (2) professors’ views about how assessment is different in an online course and a classroom environment. The views of professors and the predictions they made about the future of university teaching were much more restrained than those being made by the developers of the technology such as Kurzweil (2000). Professors, as participants and close observers of the university setting, offer important views on how societal factors can determine the rate of adoption of a technology. The findings from this research are similar to existing research on the momentum of other technologies that have been discussed in the scholarly literature (Birkerts, 1995; Manguel, 1997; Marvin, 1988).

Another area where societal factors have an influence on educational institutions and professors is in the assessment of student learning. The professors in this study were concerned about consistency between assessment in online and in-class versions of the

same course. They were also concerned about the quality of credits transferred into a program from other universities and maintaining the academic integrity of assessment methods in online courses. It was apparent that the changing technology was starting to facilitate the development and use of different ways of assessing student learning. For example, various forms of peer assessment can be more easily managed online. The momentum the classroom has as a medium for teaching and the associated societal views on what form student assessment should take will likely influence the direction that the development of online courses takes.

Another societal factor that impacts adoption is the economic model being used. Cowan (1989), as well as Schot and Bruheze (2005), demonstrated how different economic models can influence the choice to use new technology. As well, issues related to commercialization and the potential for open source course management systems have also been found to impact innovation adoption (Hepburn, 2004; Noble, 2001; Von Hippel, 2005; Werry, 2001). In terms of the economic aspects of online courses, professors identified both opportunities and problems arising from the increased use of online courses. Opportunities included contract work and marketing programs overseas, as well as experimentation with new educational environments. Some professors thought about expanded opportunities for themselves as professors, students, and the university in general.

Problems related to economic factors stemming from the use of online courses were similar to those presented in the literature (Noble, 2001). For example, one concern presented is the initiation of new hiring practices by the university that involved hiring less qualified “instructors” rather than full-time professors. Moreover, some components

of courses or programs were being contracted out to groups or individuals outside the university. For example, work placements were being done in the community or other institutions, as had previously been the case, but the monitoring had also been contracted out. Some professors downplayed these organizational changes, saying online courses were still only a small part of what the university did and that it was still primarily a classroom-based university. It was also apparent that the use of online courses was not consistent across faculties. While online courses were transforming some departments and faculties, the change was not perceived as significant in others. Some professors felt the university was becoming more like a business. Marketing was becoming a key consideration and students were starting to be viewed as “customers,” a trend reflected in the literature by Belbin (2004). Although commercialization is a common theme in the literature (Noble, 2001; Robertson, 1998; Werry, 2001), the lack of concern regarding the trend, as expressed by professors, indicates there may be little debate among professors about commercialization and the overall role of universities in society.

Three broad themes related to the institutional level of analysis emerged from the literature review and are reflected in the conceptual framework: the nature of the social system, communication channels, and change agents and institutional supports. Combined, the findings related to these themes in the literature provide insight into the institutional factors as they presented themselves at Memorial University. Many theories of change were examined in the literature review and the nature of the social system was identified as being an important factor in the change process. For example, Rogers (2003) identified the nature of the social system as one of the five variables in his theory of diffusion of innovations. Also, literature specifically related to university professors’

adoption of online courses highlight the importance of the nature of the social system within the institution (Miller et al., 2000; Prensky, 2001; Rajasingham, 2005). For example, many researchers have commented on the bureaucratic nature of universities and that they are somewhat isolated from broader societal pressures and generally slow to change (Bercuson, Bothwell, & Granatstein, 1997; Daniels, 1996; Laidler, 2002; Miller, Martineau, & Clark, 2000).

In this research, three important aspects of the social system emerged: experimentation and innovation, structural and organizational changes, and terms of employment. The formal and informal structures that exist within a social system influence the rate of adoption of innovations. Rogers (2003) highlighted “system norms,” or “the established behaviour patterns for the members of a social system” (p. 26). These norms set a range of acceptable behaviour and establish a standard of what is to be expected. Others have also written about how culture and practices impact organizational innovativeness (Christensen, 1997; Molleman & Broekhuis, 2001; Senge, 1990). Rogers also identified variables that relate to organizational innovativeness: the leader’s attitude towards change, the internal characteristics of the organization (centralization, complexity, formalization, interconnectedness, organizational slack, and size), and the external openness of the system.

Varied views in the literature relate to how the size of an organization impacts its innovativeness. Rogers (2003) made the generalization that “larger organizations are more innovative” (p. 409), while others (e.g., Christensen, 1997) have identified weaknesses of large companies when it comes to innovation. Memorial is an established mid-sized university and, because of this, might therefore be expected to experience more

problems innovating than a smaller, newly established university. An alternative view is that Memorial is large enough to have the resources needed to innovate; indeed, a TV studio, course designers, and help lines, among other supports are available at Memorial.

In line with Christensen's (1997) theory, Archer et al. (1999) suggested that universities set up a subsidiary within the organization to pursue innovative projects. At Memorial University, DELT was established to perform this role. Thus, this subsidiary organization strategy seems to be effective. Further, professors noted that the varying levels of adoption of online courses across faculties and departments were the result of the different leadership environments in each. It is also significant that professors identified specific organizational factors, such as terms of employment and work situation, that impacted their willingness to undertake innovations. Also of note was that the social system at the university was not static; it too was changing based on the introduction of new technology and other factors.

The importance of communications channels in the adoption of new technology has been identified in the literature. Rogers (2003) noted communications channels are important in the diffusion of new ideas. Both mass media channels and interpersonal channels have characteristics that make them important in the process of adoption. While the "mass media" plays a role in creating awareness, the interpersonal networks are more important in influencing the decision to adopt an innovation. Pinch (2005) and Granovetter (1973) emphasized the importance of communication networks in the diffusion of innovations.

With respect to communication channels, Rogers (2003) stated the experience of "near-peers" is of critical importance:

In deciding whether or not to adopt an innovation, individuals depend mainly on the communicated experience of others much like themselves who have already adopted a new idea. These subjective evaluations of an innovation flow mainly through interpersonal networks. So we must understand the nature of networks in order to understand the diffusion process. (p. 331)

Rogers generalized that “individuals tend to be linked to others who are close to them in physical distance” (p. 341) and similar to them in terms of social characteristics.

However, this research indicates that the way professors share information about online university courses varies somewhat from what Rogers’ theory of diffusion would suggest.

Some professors shared information with other colleagues in their department or faculty and appeared to value the importance of physical proximity, which is consistent with

Rogers’ theory. However, evidence also shows that the use of technology, such as e-mail

and Web pages, is changing the concept of proximity. A number of professors had

contacted people and reviewed material from other universities. These findings suggest

Rogers’ concept of proximity needs to be revised, given the prevalent use of information and communication technology and how it has changed conceptions of distance and

space. Indeed, this idea is consistent with some of the findings in the scholarly literature

related to how academics are using technology to activate “weak ties” (Constant, Sproull,

& Kiesler, 1996; Genoni, Merrick, & Willson, 2005; Haythornthwaite, 2005; Nentwich,

2005).

Another concept Rogers (2003) has discussed is that of “critical mass”: “the point at which enough individuals in a system have adopted an innovation so that the innovation’s further rate of adoption becomes self-sustaining” (p. 343). The findings

from this research support the extant literature and point to the importance of developing a group of early adopters who, in turn, encourage wider usage of an innovation. The findings of this study provide insight into how professors first heard about online courses and then gained more information about them. Also emphasized is the significance of informal communication networks and the fact that the communication networks may have changed since the earlier offerings of online courses at the university.

One of the main variables identified in the literature that influences the rate of adoption is the extent of change agents' promotion. In Rogers (2003) theory of diffusion, a change agent is an individual who influences peoples' innovation decisions "to secure the adoption of new ideas" (p. 366). The change agent is a link between those advocating change and the group they intend to change. Both individuals and organizations that promote change are considered to be change agents (Fullan & Stiegelbauer, 1991; Havelock & Zlotolow, 1995). At Memorial University, the main agent of change identified was DELT. A number of professors credited this group with encouraging and assisting in their adoption of online courses through training and ongoing technical assistance. Administrators in various faculties and the overall environment at the university were also seen as "change agents."

The current literature proposes a number of theories regarding how individuals make decisions to change (Bandura, 1986; Gardner, 2004; Hall & Hord, 2005; Rogers, 2003). The current research provides additional information about how the adoption of online courses is similar or different from other instances of individual change. Findings related to the decision making process, the nature of the change required, and the factors impacting the individual professors' decision were presented.

Rogers (2003) classified decision-making processes into three general types: optional, collective, and authoritative decisions. While aspects of each of these types of decisions are evident in the research, it is often difficult to determine the boundaries between the three types. For example, while some decisions were authoritative, with pressure being exerted on professors in various ways, usually decisions resulted from a negotiated agreement between the administrator and the professor. Other instances were noted where faculties made a collective decision to move some courses or whole programs online, as well as others where individual professors made the decision to teach an online course on their own initiative. Several professors explained they had an interest in online teaching for various reasons and this interest was the primary factor in their adoption. Some were intrigued by the newness of the methods and others were motivated by the needs of the students. Several of these professors would be considered “innovators” based on Rogers’ (2003) categorization (Figure 2) and the decision-making process would be classified as “individual.”

Some of the findings challenge the idea that adoption is a “process.” In recent years, some of the younger professors had either formal training related to educational technology or found it a natural way to teach. For them it was not really an adoption process as much as a natural progression of how they used technology in their everyday lives. Some other professors said adoption was not a “process” for them either because they had come to teach online courses in different ways from the majority of their colleagues. They would be considered “innovators” in that they either sought out, or “evolved” into, this way of teaching as part of their personal interest in teaching with new

technology. This group includes many of the early users of online courses at the university.

Another important factor in the process of adoption was the context in which change was taking place. In some faculties and departments, co-workers were hostile to the idea of online teaching. In others, online teaching was viewed as a search for new ways of dealing with problems that had led them to adopt online courses. In some instances, a large class of students and the need for non-static ways of teaching the course was a driving force. Professors responded to the needs of students with whatever resources were available to them.

As noted in the literature, the nature of the change required when adopting something new is an important factor in an individual's adoption. Several sources have distinguished between continuous and discontinuous change (Bandura, 2006; Moores, 1999; Rogers, 2003). Two major themes have emerged from this research regarding the nature of change required by individual professors as they adopt the use of online courses: changes in the role of the professors and changes in the nature of the class. The role changes required of professors are important in the context of Rogers' framework. Rogers predicted that innovations that are less compatible with those that precede them are less likely to be adopted. Given the lack of compatibility, online courses would be considered a "discontinuous" innovation since the findings demonstrate they represent a significant break from previous practice. Several researchers have discussed the difficulty of encouraging the adoption of "discontinuous innovations" (Archer et al., 1999; Christensen, 1997; Duderstadt, 1998; Moore, 1999).

Professors indicated several ways in which their role changed when they taught online courses. For example, the flow of information was different in an online course than an in-class course, and the role of the professor was not as central to online teaching as it is to classroom teaching. They also felt the personality and background of individual professors impacted adoption. The findings also show how the nature of courses change significantly when they go online. Taken together, the changing role of the professor and the changing nature of the class demonstrate that online courses are a discontinuous innovation for most professors. Because of this, more elaborate strategies are necessary to encourage the adoption of online courses.

Several studies have focused on factors that influence the adoption of online courses (Conrad, 2004; Daugherty & Funke, 1998; Lehman, 2006; Wolcott & Bretts, 1999). One such factor is job satisfaction. Noble (2001) described how online courses could negatively affect professors' job satisfaction. The findings of this study are of particular importance, in light of this view. This research provides insight into the emotional aspects of teaching online and the complexities of how it impacts professors' job satisfaction. For example, some professors enjoyed online teaching but would prefer to not teach all their courses that way. The most often noted drawback of the format was the limited personal interactions with students. Many professors felt isolated and missed the informal contact with students, which they get by teaching in-class. Professors also identified positive aspects of teaching online, including feeling they were meeting the needs of students, the challenge of undertaking something new, and the satisfaction of creating a learning activity for students. However, there are also indications that the relationships that students develop with professors and their university may suffer

because of the lack of informal personal contact associated with online courses. Similar findings have been noted in relation to the importance of emotions in work (Goleman, 1998; Lehman, 2006).

Several studies have identified issues related to time in university professors' adoption of online courses (Bretts, 1998; Dooley & Murphrey, 2000; Maguire, 2005; Mckenzie, Mims, Bennett, & Waugh, 2000; Parker, 2003). Many similar issues have been identified in this study. For example, most professors conveyed that it took considerably more time to develop, teach, and conduct assessments in an online course. Other issues that have not been identified in the literature also emerged—for example, issues around controlling the pace of the course, and not having scheduled work time. This research adds to the existing literature in the field by expanding the understanding of these issues. The time issues may be of a transitional nature, as professors continue to develop new practices that are suited to online teaching. The way some professors were developing strategies and practices to manage their time in online courses provides models for the further development of practice in this area.

The findings from this research provide answers to the research questions that have guided this study and expand current knowledge related to many of the issues arising in the literature review. Findings from case studies are often difficult to summarize because, by their nature, they present detailed insight into complex instances (Flyvbjerg, 2006). Summary tables of key finding have nevertheless been developed to highlight the significance of the findings from this research (see Tables 1, 2, 3, and 4). The findings have been organized in a way that situates them in the three interconnected levels of analysis: societal, institutional, and individual. These findings provide an

opportunity to conduct further analysis in the next sections in terms of identifying the implications for theory, practice, and further research.

Challenges and Limitations

As the above discussion of the findings indicates, many interconnected factors influence university professors' adoption of online courses. A combination of the existing theories of change can be used to help analyze various aspects of change in terms of professors' adoption of online courses. This study demonstrates the difficulty of quantifying the factors that impact a university professor's decision to adopt the use of online courses. There are many differences in the ways online courses can be configured, including the subject area, the professors' level of technical skill, and the student population being served. The nature of the innovation itself may also contribute to the problems in making solid analytical statements about the nature of various forces in determining online course adoption. Online courses are not only a combination of courseware and course management systems and the way these systems are configured but also the techniques of individual professors who bring their own preferences and style to the online course. Online courses are still in the early stages of development and the findings indicate a lack of stabilization in this innovation. However, this research is important because there are many opportunities for influencing the future development of online education. As the innovation stabilizes it will become more difficult to influence both the technology being used and the procedures related to its use. Many of the professors interviewed expressed the view that online courses have the potential to bring about both drastic and positive changes in our education system and the way it is organized. Yet, many forces within society, such as the momentum of the current

educational system, could prevent this from happening. Research of this type helps identify issues involved and provides a basis for political involvement in shaping the technology.

Another challenge with this research was that the professors were at various stages in the adoption of the technology. While reference has been made to specific characteristics of professors throughout the presentation of the findings, it is useful to demonstrate more clearly that variables in this study are not constant over time. As Strauss and Corbin (1990) noted, data is often presented “as a slice of time, rather than over time, with relevant past, presents, and futures” (p. 160). The findings of this study (see Table 5) clearly demonstrate that the variables in this case were not stable over time. Although many scholars, such as Bijker (1995), have raised concerns about linearity or deterministic approaches, it is useful to present some generalization about how variables at each level of analysis change over time. Rogers (2003) and Hughes (1989), among others, have suggested phases in the adoption of innovations. The work of these scholars, as well as the findings from this study, was drawn on to identify the four phases presented in Table 5, which are useful for examining the adoption of online courses and demonstrating change over time. It is important to note that these are generalizations based on the findings from this case study. In fact, this table demonstrates the volatility of the innovation pattern that can be identified. The absence of some of these variables at particular phases could lead to a stalling of the adoption of the innovation or the pursuit of another development route. For example, if a group of early adopters had not been present or administrators had not pursued a strategy of offering centralized support services or student groups had not been accepting of this new technology the outcomes

may have been different. Also of consequence to note is the process of adoption that occurs in an environment of technical and educational change, which may result in professors experiencing several phases at the same time. While some aspects of the innovation are stabilizing, others may still be evolving. It is difficult to account for the many changes that are happening over time. However, Table 5 indicates the flow of events over time for this particular case.

Every research methodology has its strengths and weaknesses. This is a case study of one university and the transferability of the findings is limited by this factor. It is evident from the literature that the supports available vary drastically among universities. Some universities, such as MUN, have instructional designers, video production units, help desks, and other forms of support for online professors and students, while other universities have little or no support for professors who want to teach online. While gathering data at one university is a limitation in some respects, the in-depth examination of one university provides a broad understanding of the operation in this particular context. Moreover, it provides insight into procedures that can work or problems that may develop. Through this approach, this research also provides a basis for future research and further comparisons.

Another limitation of this study is the way in which the Concerns Based Adoption Model (CBAM) was used as a method of triangulation. CBAM is a commonly used model for examining change in education and it includes some of the most widely accepted quantitative measurement tools used to guide educational change efforts. The purpose of CBAM is to predict what is happening in the change process so proponents of change are better able to attend to the needs of the people involved and preventing much

that often goes wrong (Hall and Hord; 2005). The underlying assumption is that there are identifiable patterns in the change process.

While CBAM has been used in other environments, it was primarily developed for use in the school system. When it is removed from this setting and used in other contexts, several problems come up that make it less useful than expected for purposes of triangulation. The twelve principles of CBAM put forward, supposedly indisputable, are statements about the nature of change. There are several areas where post-secondary institutions are different from schools and it is not taken into account in CBAM. For example, the work situations for university professors are different in many respects from that of teachers at schools. University professors usually have more academic and employment freedom in their work. In many cases, they have higher social status than the people who are working as change agents. In a school, the situation is the reverse, with the change agent often having higher social status than the intended adopter.

Furthermore, university professors generally are more cosmopolitan than adopters in other contexts, because they often interact more with people outside their physical proximity. Thus the context or environment in which this innovation occurs is different in many ways.

The innovation itself—online courses—poses several problems for CBAM as well. The innovation is broader in scope than many others, as it is a new teaching environment. This makes it very different from other changes such as a localized change in procedure, a piece of technology or the introduction of a new teaching methodology for a specific subject area. The way CBAM is structured does not account for the diversity of forms this kind of innovation can take as it is applied in various contexts.

Further complicating this factor is the continually changing nature of the innovation itself, as the technology and techniques related to it continue to evolve. This instability, or continually evolving nature, presents many problems for any theory based on people passing through firmly defined and quantitatively measurable sequential stages. As the innovation changes, professors may be experiencing several stages at the same time or appear to be returning to previous stages, as various components of an online course change.

Not only are the principles of CBAM problematic in the context of this research, but the usefulness of the three diagnostic tools is also drawn into question. There are many questions related to the innovation configuration, the stages of concern questionnaire and the level of use measure. The configuration is difficult to devise for this innovation because an authoritative vision has yet to be established as to how the innovation should be used. For example, a configuration for an online math course would be quite different from that for an online history course. The configuration for a math course most likely would involve the use of graphic equation editors, whereas the configuration for a history course would not but most likely would involve a more sophisticated use of a discussion forum. Variables that could further complicate the innovation configuration include the number of students involved and the level of the course. An introductory first-year course, for example, would be quite different from a graduate-level seminar type course. Once a classification system of different course types was completed, a way of updating or renewing the innovation configuration would have to be instituted as well, so that evolving technology and teaching practice could be integrated.

While innovation configurations could be designed in this manner, there are dangers in attempting to impose strict adherence to such innovation configurations in a university setting. For example, they might restrict experimentation, cause concerns about academic freedom, and hamper the individual style or creativity of professors. These problems with developing an innovation configuration could lead to additional problems related to the third diagnostic tool: the level of use indicators. Also, as with the other diagnostic tools, the levels of use might not be as easily distinguishable as in other innovations because of the complex nature of the innovation as well as the continuing evolution of the technology and teaching practices. For the reasons given above, CBAM did not provide a useful method of data triangulation for this study. However, as mentioned in the suggestions for further research, this idea that adopters pass through a series of stages of adoption needs further research.

Other limitations of this study relate to its scope and the selection of participants. This study only included professors who were teaching online courses or who had taught them in the past. While this approach allowed for a focus on the users and their reasons for the adoption of online courses, it did not examine the perceptions of non-adopters. Also, students' views were not directly sought in this study. The perspectives presented are those solely of the professors.

Despite the challenges and limitations noted, the findings from the interview data provide insight into many aspects of the adoption of asynchronous online courses at Memorial University. This information expands our understanding of what is happening by providing detailed insight into how various factors influence professors' adoption of online courses. While the findings of this study are gathered from a relatively small

number of professors ($N = 32$) located at one university, they provide a basis for making important observations for professors, administrators, course designers, and others who are interested in the adoption of online courses. This research is broad in nature and encompasses many theoretical and practical issues related to how technological change occurs. In many ways it is an initial foray into unexplored issues about the adoption of asynchronous online courses.

Analysis of Findings based on the Conceptual Framework

Drawing on the conceptual framework for this study (Figure 3) that includes the social constructivist theories of change as well as Rogers' (2003) theory of diffusion of innovation, the findings from this study are presented in Figure 6, which illustrates how factors present themselves at the three levels of analysis. This presentation operationalizes the ideas of Misa (1994). Misa called for a combination of macro- and micro-level factors when analyzing how change occurs. While the conceptual framework was developed based on findings regarding the adoption of online courses at a specific university, it is possible that such a framework could be used to analyze the adoption of online courses at other institutions, as well as for other innovations.

While one case study does not provide a sufficient basis for verifying a new theory of change, this study does provide a comprehensive framework for examining change in this context. The inclusion of many of the social constructivist elements in Figure 6 recognizes and emphasizes the importance of the larger context in which technological change occurs. It stresses the political nature of technological innovations—a factor that many academics have commented on in their work (Bijker, 1989; Callon, 1989; Winner, 1985). Providing insight into how these forces operate also

demonstrates that other alternatives are possible. One of the characteristics of Rogers' (2003) theory of diffusion is that it does not address the difficult political problem of evaluating the consequences of innovations. His theory can be used to examine diffusion in cases where the innovation is obviously not desirable, as well as cases where it is believed that the innovation is beneficial. While recognizing that there has been a pro-innovation bias in much diffusion research, Rogers noted that in many cases it is difficult to determine the consequences of innovations. In the most recent editions of his theory (Rogers, 1995, 2003) he classified consequences not only as desirable and undesirable, but also as direct / indirect and anticipated / unanticipated.

By viewing online courses in a broader environment of technological change, comparisons can be made to what has happened in other fields. A number of researchers (Tenner, 2003; Van Oost, 2005) have illustrated how cultural factors can influence the development of new technologies. They highlighted that the things we value as a society often influence in a political way how we perceive and evaluate innovations. In this study, the cultural values of wider society were evident in the way professors recognized the advantages or disadvantages of online courses. For example, the value placed on human interaction as a way of learning was evident in how professors perceived online courses. Also, the recognition of accessibility issues was partly based on the desirability of accommodating factors of distance and not uprooting people.

Several researchers have discussed the way the "user" is configured by developers and those who are involved in promoting innovations. For example, Bijker (1995) talked about relevant social groups and Wyatt (2005) highlighted the importance of non-users. Including these elements in a theory broadens the way innovations are considered. In this

study, it was difficult to identify how various relevant groups, such as students, professors, and administrators, reacted to the innovation. Indeed, the difficulty of including the views of relevant social groups in the configuration of an innovation is highlighted in the literature (Bijker, 1995; Epstein, 2005; Rose & Blume, 2005; Schot & Bruheze, 2005).

Examples from the medical field illustrate how many groups are either entirely left out of or under-represented in drug tests that lead to the development of new drugs (Epstein, 2005; Rose & Blume, 2005). Similarly, as we develop and design an education system, we should ask what groups are being left out. If we choose not to offer courses online will we leave out people who live in rural areas and professionals who do not have the predictable schedules required for in-class courses? Conversely, if we do offer online courses, who are we then leaving out? Are people who do not use, are uncomfortable using, or do not have access to technology not being considered? Are some forced to take this type of course, just as in the case of the vaccines described by Rose and Blume (2005)? The questions are just as complex in the case of online courses as they were in the “consumption junction” discussed by Cowan (1989) and the “mediation process” examined by Schot and Bruheze (2005).

The importance of the economic model is illustrated by Cowan (1989) and Schot and Bruheze (2005). The findings from this study illustrate that a competitive economic environment is developing in post-secondary education. Another aspect of economics and government regulation is the choice being made between course management packages such as WebCT, which are controlled by commercial interests, and those that are open source, user-developed packages. While some have noted the implications and need for

open source development and its use in education (Raymond, 1999; Werry, 2001), this issue was only brought up by a few professors interviewed. This is an indication of the limited way that many university professors are engaged in thinking about the political implications of the technology they use.

The findings of this study indicate that alternatives regarding technology exist for both institutions and individual professors, just as they do elsewhere in society. Incorporating elements of the social constructivist theories into the conceptual framework certainly enhances its' ability to help us "envision new worlds" and provides insight into a number of areas that cause us to reflect on the way we view things.

One important feature of the conceptual framework used here is that it indicates the interactive nature of factors at the various levels of analysis. It is important to identify the fact that relationships exist and then take this one step further by providing insight into the nature of the relationships. The nature of some of the possible relationships between the variables that have been identified will be outlined below.

Societal factors are often seen to be beyond the scope of the individual or even the institution to change, especially in the short term. They are often accepted as forces that have to be understood and dealt with rather than seen as factors that can be changed. Some of the possible relationships between the economic models used in the broader society and the situation faced by institutions and individual professors were evident in this research. First, competitive economic environments could force the institution to be more innovative. Second, it could cause universities to compromise quality to compete in other ways, such as on price or convenience. Third, these factors could cause universities to change the employment relationships they have with individual professors. Fourth,

competitive economic environments pressure universities to treat students as customers, which could impact the way institutions and individual professors do their work. Fifth, the presence of commercial or open source course management packages could determine levels of innovation and experimentation. Lastly, there is evidence that for-profit ventures could change the focus of universities and the type of courses they offer.

In terms of existing technology, case studies of other innovations have shown that new technologies often cause change in the economic and political situation, creating new dynamics or requiring new regulatory mechanisms. In this study, the presence of nonhuman actors, such as climatic conditions and distance between small settlements, had impacts at both the institutional and individual level. Pressure was placed on the institutions to develop solutions that met the needs of the population it served. Also, there is evidence that the individual professors were very understanding of the challenges faced by students learning at a distance and were willing to change their practices to help address the students' needs. The relationships that were revealed in this study support the idea that societal forces are often difficult to influence, particularly from the level of the institution and individual.

The presence of institutional level support for adoption lessens the time and technical skills required by individuals to adopt. While this speeds up the process of adoption, it also imposes a standardization that could hamper further innovation and experimentation. While there was evidence that a centralized group within an organization can have a tremendous impact on providing useful communication channels, the general environment in an institution was also emphasized. The presence of formal

communication networks in an institution had negative impacts on the willingness of individual professors to take the time to help others, the way they did before the formal networks existed. Other programs and supports established at the university, which may not be directly related to offering online courses, had a positive impact on the systems' openness. For example, funding for conference attendance and the presence of visiting faculty was seen as important. Even the hiring practices of the institution had an impact on the formation of communication networks. Sessional professors were not as integrated into the university as regular professors and they were less willing to undertake innovative projects that required a long-term commitment.

The fact that outside factors can influence the decision-making process at an institution is evident in several ways in this study. An infusion of government resources created a new decision-making environment. The individual process of making decisions was influenced by both the formal and informal supports that were available. The historical development of universities has led to the entrenchment of academic freedom in society and influenced the way university administrators make decisions. In this way, universities are drastically different from other organizations, such as independent companies. Also, the difficulty of replacing qualified university professors influences the kind of employment relations and decision-making processes that evolve within an institution. The presence of new technology in society impacts the kind of communication networks that are possible. For example, the existence of the Internet has changed the concept of proximity. The actions of individuals are influenced by the ease with which "weak ties" can be activated because of the presence of this new technology. One unintended consequence, in terms of communication, is that students may not be as closely

connected to the university as in the past. Professors commented on the lack of feedback from students in the form of informal conversations and were concerned that this could make it more difficult for them and course developers to understand the needs of the groups they are teaching. Difficulty in “configuring the users” could result in a mismatch between what professors are doing and what students expect.

Because the role of the professor changes with the adoption of online courses, new pressures may be placed on institutions and society. With the changed role of the professor, the supports they need from institutions may change, as well as the way they are perceived in society. Because the role has changed the type of person attracted to the job may change. Furthermore, expectations may also be altered. For example, because courses are pre-planned, a higher standard and expectation of organization might develop in society. Another result might be that professors become more innovative and push forward change faster than the university would like. Through their individual actions they might force institutional and social changes. Given the role played by earlier adopters at this university this is not an unrealistic possibility.

Another dynamic of change for the individual professors is the changed nature of the class setting, which may affect society’s view of the role of university teaching. The link between work and learning might become more immediate. The large numbers of mature students enrolling in online courses may make different demands on institutions and professors. Further, the geographic diversity of online students will likely change the kind of support services offered. A 24-hour help desk could be easily arranged, but the cultural awareness required to teach to a global environment might be more difficult to develop.

Professors' job satisfaction is another variable related to societal and institutional factors. General comfort levels with and the use of technology seem to be increasing in society as younger people grow up using technology as a part of their daily lives. This societal dynamic might result in greater satisfaction with teaching online in the future. Professors often compared their satisfaction with teaching online with that of teaching in-class. The fact that classroom teaching is changing as well, impacts the way professors evaluate the online teaching experience. Another dynamic also seems to be developing as professors, based on their experiences teaching online, initiate change in how they teach in the classroom. For example, professors were integrating more technology in their classroom courses. Professors may also develop new techniques based on the presence of new technology. Another factor that affected professors' satisfaction was the level of control they have over their own work. This may result in pressures being placed on universities to establish course development structures that ensure professors maintain control of the course development and delivery process. One aspect of this might be the use of open source course management packages that allow for maximum flexibility.

One major concern for professors was the amount of time it takes to offer an online course. This factor is also related to the two other levels of analysis—societal and institutional. The supports that are available at the institutional level can affect the amount of time an individual professor spends teaching. At the societal level, advances in technology and the development of techniques related to online teaching may also play a role in the amount of time it takes to teach online. For example, the use of “learning objects” —small instructional components that can be reused a number of times in different learning contexts —may cut down on development time. The amount of time

spent teaching is in some ways influenced by the momentum of classroom technology. Professors have not yet developed techniques based on the possibilities offered by online teaching. Many are still using classroom techniques in this relatively new medium. As with any new medium, techniques often adjust to the changes in the affordances of the available technology.

The way professors come to teach online courses might change as the general pervasiveness of information and communication technology in society continues to increase. Younger professors may see online courses as a natural way of teaching that requires little adjustment. The university could change its hiring practices to reflect the growing importance on having professors who can teach online. Experience with technology and willingness to teach online could become part of the job description for newly hired professors. In addition, if more pressure develops to move courses online quickly, university policy and administrators could become more aggressive in getting professors to teach online. As professors teach more courses online they tend to develop a more positive view of the technology and begin to experiment with their online teaching. Such a change in attitude could create an innovative atmosphere at the university that leads to experimentation with new teaching technology.

The third role of theory is to “keep us honest” and cause us to reflect on practice and make suggestions for change. This conceptual framework provides a tool to aid reflection on practice. The framework offers a way of viewing situations that allows for the identification of various factors that influence adoption and how they are interrelated. By relating broad societal factors, institutional organizations, and the actions of individual professors, it can be used to develop scenarios for change. The connecting of

the various factors illustrates not only that individuals and groups can bring about change, but it also helps identify ways in which this might occur. For example, if the acceptance of commercial courseware by individual professors and universities is a potential problem, where might the resistance emerge? Individual professors could refuse to teach courses using commercially controlled software and encourage other professors to do the same. They could also encourage the university to support the use of open source software. While taking these actions, they might also be involved in broader societal efforts to encourage governments and other organizations to use open source software. As the preceding analysis demonstrates the use of this conceptual framework can be an aid in the development of scenarios for change. As such the conceptual framework provides a practical guide for action. In the next section, the practical implications of the findings of this study are more fully explored.

Practical Implications

In this section, the practical implications of the research will be presented. While as a case study the transferability of the findings from this location may be limited for application elsewhere, those attempting to make such a transfer should assess the similarities and differences between the settings involved. A number of suggestions are put forward for consideration in this context based upon the findings of this research. For example, it is useful to have insight into professors' views of relative advantage, compatibility, complexity, trailability, and observability. Strategies can be devised to address these issues based on an understanding of these perceptions. The way we prepare and offer services to online teachers can be informed based on the findings of this research.

A significant finding in this study is that professors demonstrated a broad understanding of the characteristic termed “relative advantage” when they made decisions about how to teach a course. Access for students was seen as the major advantage by professors as they recognized that some students would not be able to take classroom courses. While some professors indicated they would rather teach in class, they took a more holistic view to determine the “relative advantage” including the non-pedagogical aspects of teaching such as accessibility. Convenience for the professors was also seen as an important advantage, which indicates that the number of online courses offered or the opportunity to teach online courses could be used as an enticement in the recruitment of professors.

Just as it is important to gain a better understanding of the advantages of online courses, it is also important to identify some of the disadvantages; this way strategies to address these problems can be developed. It is worthwhile to note that the disadvantages of online teaching are usually identified in terms of comparisons to face-to-face classroom teaching. Many professors have accepted classroom teaching as the standard by which other modes of teaching are to be judged. For example, one disadvantage of teaching online, which has also been identified and discussed by other researchers, is the lack of visual cues (e.g., body language) and the impact this has on learning (Buckingham, 2003; Inglis et al., 2002; MacDonald & Thompson, 2005; Meyer, 2004; Roval & Barnum, 2003; Stodel, Thompson, & MacDonald, 2006; Wilson & Whitelock, 1998). A similar disadvantage, which becomes particularly evident when attempting to teach in areas that require “hands on” manipulation of objects, is that with the present technology many of the senses we use in class are not applicable online. Rather than it

being a consequence of inherent limitations of the format, these problems may be the result of our inability to approach the new teaching medium without the baggage of a classroom mind-set. Students, professors, and instructional designers may find ways to overcome these problems in time or technological advances may occur that will help solve these problems. The increased use of “social software” in the past few years demonstrates that significant advances are being made in this area.

Online courses are different from both classroom and correspondence courses. Professors described how their role as teachers changed when courses moved online. They felt they became less central to the teaching-learning process. The idea that the role of the professor is not as central in online teaching has come up in other research (Conrad, 2004; McFadden et al., 1999; Pelz, 2004). The findings of this study provide some insight into professors’ perceptions of, and reactions to, this role change. The altered role for professors may be important in terms of faculty recruitment at universities. For example, innovativeness may become a more desired trait in a potential employee than the ability to teach in a classroom.

Those interviewed for this research provided insight into how the very nature of the courses they taught changed when the courses were placed online and how the composition of the class became more diverse. Since the students were generally older and had more work experience, the courses tended to take on a more practical, rather than theoretical, direction. In some instances, the students who were accessing the course from their work site attempted to immediately integrate what they had learned into their working lives. This is a significant shift from the traditional classroom course where the students tend to be younger and have very little work experience. It might also be an

early indication of how, in the future, the connection between education and the workplace will become more direct and immediate. Another factor influencing the nature of the class was that students in the online courses tended to be drawn from a broader geographic area and thus the experiences they brought to class were different. Although most of the students were still from within the province, more were from smaller communities and there were more part-time students. Student diversity usually led to more interesting discussion on issues as differing perspectives were offered. This was especially notable of courses in the social sciences and professional fields. This finding provides an example of how online courses can, in some ways, be better than in-class and how students who are now enrolled in classroom courses might benefit from learning online. For some professors, the changing nature of the class also posed a dilemma. They wanted to keep the course format consistent with the in-class version, but the different compositions of students sometimes required a different approach.

Job satisfaction was another area that influenced professors' overall perception of online courses. While many professors noted examples of aspects they liked about teaching online courses, many of them missed the face-to-face interaction with students and the informal contact with others in their profession. This point is important, given that universities are already criticized by some as "ivory towers". The lack of a "close" relationship with students might also impact the institution, as it often depends on former students for continued support when they move into their chosen professions. For example, professors contact former students to help with job placements, site visits for students, or assist in other ways that facilitate an exchange of information between the educational institution and people working in the field. Universities also look to alumni

for financial contributions and other support. If a feeling of “connectedness” is not present between the professors and students it could have long-term consequences for the institution.

The opportunities and problems presented by the use of online courses were also examined in this research. The fact that professors suggested potential opportunities is a good indication that there are areas of contract training to be explored. There is an emerging dichotomy of views in that while some professors see this opportunity in terms of commercial or revenue generation, others see it more in terms of expanding educational opportunities for students. For example, the variety of courses available to students at the university might increase if students were drawn from a broader geographic area. Conversely, professors identified problems online courses were presenting for universities. The socialization function of the university is seen as critical by many scholarly writers, as well as by the professors interviewed for this study (Cuban, 2001; O'Regan, 2003; Robertson, 1998; Roval & Barnum, 2003). Professors felt that online students were in some cases missing opportunities to discuss matters informally with professors and other students. Further, several professors thought the full potential of online courses was not being realized since insufficient thought had been given to the development and adoption of these courses. Because of this, the technology was being used in limiting and even damaging ways, which would negatively impact the support for the use of new technology in education. This fear would appear to be realistic given that some writers have documented the failures of technology in education (Cuban, 2001; Robertson, 1998) and criticized the use of online courses (Noble, 2001).

The university professors interviewed provide useful insights into the impact of online courses on professors' time. While this and other studies have documented that online courses demand more time, this work adds to that literature because it sheds some light on the reasons why online courses are more time consuming. Although no clear consensus on some aspects of the time issue was achieved, several points did emerge. While it is unclear if time considerations are part of the transitional problems as professors come to terms with working with unscheduled class time, it is certain that the time it takes to teach an online course is a major issue with many professors. This factor may be a major deterrent for professors considering online adoption of courses.

MacDonald et al. (2005) emphasized the time and energy required to offer a quality online course. They suggest new teaching methods, and in particular more efficient methods of designing teaching resources, are necessary to bring about more widespread use of technology in education. One such approach they advocate for reducing the time needed to integrate technology is the use of learning objects.

One area where some say compatibility is needed between different modes of teaching is the assessment of student learning. There is evidence that this area will continue to be contentious as more courses move online. Several professors contended plagiarism is more of a problem in online courses and others expressed concerns about the quality of the invigilation of exams in smaller communities. Several prominent critics of the use of technology in education (Noble, 2001; Robertson, 1998) and organizations such as the American Federation of Teachers have also questioned the quality of online courses (Blumenstyk, 1999). Given the views of the professors interviewed in this research and the way this issue has been raised in other forums, it is reasonable to expect

that assessment and accreditation of learning will be a key point of contention between those who support and those who disagree with the use of online courses.

Complexity, or “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 2003, p. 257), is also an important factor in adoption. A number of lessons can be learned from the technical difficulties associated with delivering online courses that were experienced in the early days at MUN. These can provide guidance for other universities just starting to offer online courses or those in countries where the communications infrastructure is less modern. It removes a considerable burden from the professors and makes the online experience easier for students when functional centralized services are in place, such as a help desk that deals with technical problems. Some professors expressed that all professors should be expected to improve their technical skills so they are better equipped to deal with minor technical problems, as well as make better use of the teaching medium. While this may be an appropriate long-term goal, the evidence from this research demonstrates that a focus on establishing central supports is more helpful if the goal is to rapidly move courses online. It is significant that in the absence of such centralized technical supports, many of the professors interviewed would not have been able to offer online courses.

Trialability, or “the degree to which an innovation may be experimented with on a limited basis” (p. 243), is another characteristic of innovations explored by Rogers (2003). The findings in this study indicate that professors experimented with aspects of online courses by integrating technology into their classroom teaching. In addition, the experiences of peers sometimes served as an alternative for trials. Other times, professors started out co-teaching an online course. Many of the professors offering online courses

already had experience using technology in teaching, or at least had taught some form of distance education course in the past. Rogers proposed that innovations that allow easy trials are adopted more quickly than those that do not. In the context of online courses at this university, trials seemed to be easy to arrange. This point is important as many professors, especially the sessional instructors, were not motivated to invest a lot of time into trying something new since they were not certain if they would be employed in the long term.

This research supports the importance of another attribute in Rogers' (2003) framework, which he refers to as "observability" or "the degree to which the results of an innovation are visible to others" (Rogers, p. 258). Many professors noted they had attended demonstrations held by DELT or examined courses taught by other professors before teaching a course themselves. The nature of the innovation made it possible for professors to establish an account that allowed others to "lurk" in a course over a period of time and observe how it progressed. Another factor was the ease with which professors could look at courses being taught at other universities. Several professors mentioned that they had been granted passwords and reviewed courses taught at other universities.

Just as teaching at a distance using other modes of delivery may have had a positive impact in predisposing professors to teach online courses, the previous use of technology in the classroom also appeared to lead to a future of online teaching. Experience using technology before teaching an online course appeared to ease the process of adoption for professors. The practical implication of this is that if universities want professors to start teaching online courses, they should first consider encouraging them to use technology in their classroom teaching. Rogers (2003) explained that the

trialability of an innovation plays a role in how quickly it is adopted. Long-term strategies encouraging professors to integrate online technology in their classes might facilitate further adoption of online courses. Even the use of other innovative teaching methods might indicate a predisposition to trying new technology.

The right of professors to refuse to teach online courses will likely become an issue of contention between faculty and administration in the future at many universities. One possible outcome is that the professors' right to refuse to teach online remains in place but administrators use a system of positive and negative incentives to encourage adoption. An alternative scenario would see the issue disappear as more professors want to teach online courses and thus fill the demand. There seemed to be less hostility among the professors involved in collective decisions about online adoption, which reinforces the importance of persuasion, rather than coercion, in getting professors to teach online.

In terms of understanding communication channels, this study highlights how professors obtained information about online courses. It emphasizes the importance of conferences and new ideas from outside the university and the difference between formal and informal channels and how they can be developed. The research also demonstrates how hiring practices can impact communication channels and the need to integrate sessional instructors into the academic life of institutions so that knowledge transfer can occur.

For practical reasons, it is also significant to understand that the nature of communications may change during different stages of adoption. The early adopters provided some insight into how communication networks have changed over time. A number of these professors indicated that they had assisted others by sharing their

experience. Then, as online courses become more common, a more formalized network emerged. Administrators should consider implementing strategies to maintain these informal networks, while also ensuring more formal supports come into existence. There was some evidence that the early adopters and innovators were growing “tired” of the role of explaining to other people how to use the technology and this experience should not be wasted. Even though professors felt the “experts” were at DELT, the importance of the informal supports should not be overlooked. Furthermore, the idea of having support staff located right in the department or faculty was important for some professors, especially during the early days of adoption.

A point worth emphasizing is that some professors expressed a lack of contact with others at the university; this was particularly evident with sessional instructors. As more sessional professors are contracted to teach online courses the lack of presence on campus and the lack of interaction with other professors might mean the benefits of informal communication networks are not fully realized. University administration should take this into consideration in their hiring practices or facilitate the development of other communication networks that will replace the traditional informal contact that is diminishing.

Interest in technology related conferences, and academic journals, was evident primarily among the innovators and early adopters. Incentives to encourage attendance at this kind of event therefore appear important in the early stages of adoption, as well as for promoting the continuation of experimentation and innovation. Several professors noted that co-teaching had allowed them to obtain skills from each other, suggesting this is a process that administration should encourage. Involvement both within and outside the

university community are common ways to share information. Discussions with students and new professors entering the university were chief sources of new information. Based on this, administrators should encourage exchange programs with other universities and develop programs to encourage the injection of new ideas from outside sources.

The structure of a “social system” is complex. At a university, professors’ roles and expectations are outlined in the terms of employment. Professors’ terms of employment had an impact on the adoption of online courses. Some professors, especially those hired sessionally, were happy to teach courses for extra pay—although, in some cases, they felt they were being “used” and not getting as good a deal as full-time professors. There were several expressions of bitterness about the rate of pay received for teaching online courses. Professors were unsure how arrangements were negotiated to teach courses with small enrolments as part of their teaching load.

Other aspects of the terms of employment of professors influence the social system. For example, under their terms of employment, many professors cannot be forced to teach online courses. While such a situation might prevent administrators from imposing their will, it might also necessitate a more cooperative approach—an approach this research indicates may be more successful in the long run. In addition, some professors were willing to teach more courses if they were online than they would have done otherwise, since the online format provided greater flexibility. Universities therefore may get more, in terms of number of courses taught, out of their current professors if this teaching option was available. Given the developing shortage of faculty being predicted by some sources (Melchers, 2001; Ontario Confederation of University Faculty Associations, 2001), this factor may become more important in time.

This research provides many insights into the nature of the situation faced by online professors and the type of support services that should be offered to professors. The role and importance of Web designers was highlighted and clues were given as to how they can be effective. The role of assistants in the departments and faculties who work near professors was also recognized as being important. It was apparent that the services required changed over time and that those required by professors adopting later were different from those required by the first adopters. There is a need to monitor the evolving needs of adopting professors to ensure they are receiving the resources they require. A debate is also evolving about what technical services should be offered to professors. For example, should professors design their own courses and possess the necessary technical skills to make changes to their own courses? These are practical concerns that need to be addressed based on the circumstances in each particular case.

DELT was perceived by many professors as a driving force behind their adoption as they provided the necessary support services. The staff at DELT pushed innovation once online teaching commenced. The services they provided had expanded over the years and professors who had taught online for a long time noted the improvements. The training sessions offered by DELT were also seen as being beneficial by many professors. Equally important was the informal learning that occurred at DELT training sessions as professors were exposed to their colleagues' activities. As well, the course designers at DELT were seen as valuable sources of information and the technical assistance they provided was considered very valuable. The help desk, for example, made life less stressful for many professors. Also, the administrative functions that DELT undertook would have been difficult to organize if such a centralized body did not exist.

Combined with the leadership within various faculties, having several groups pushing for change has been instrumental in encouraging adoption at MUN. The impetus for change came not only from DELT, but also from various departments and faculties within the university. This research emphasizes the importance of support from those who understand the subject area and can make recommendations related to the effective use of technology in individual faculties and departments. Some faculties and departments were very engaged in promoting adoption, while others were not. Those who promoted the use of online courses were having success in changing professors' perceptions and in encouraging adoption. The evidence from this research indicates leadership at the faculty and department level is a significant variable in determining the number of courses and programs that go online.

Suggestions for Further Research

Online courses are still a relatively new way of offering learning opportunities and, in many ways, developments in this field are still in their infancy. This research represents an initial foray into unexplored areas and the many issues that the introduction of this new technology precipitates. Our still evolving understanding of this field is evident in the many avenues for further research that have been identified.

The views of students were important to the professors interviewed in this research. Some professors explained that while they viewed online courses as "second best," they agreed to teach them because some students would not otherwise have access to the courses. Further research is essential to determine whether professors have an accurate understanding of students' views of online courses. Also, attention should be directed toward developing a better understanding of the different perceptions that exist

among different types of students, such as mature professionals, students located a long way from the university, and younger on-campus students enrolled in online courses. This research suggests there are differences based on subject area and the level of course and this should be more fully explored.

One ongoing change professors noted was that online courses were more pre-planned than classroom courses. Fewer decisions were made during the offering of the course based on students' needs and changing events. Some professors found ways to bring new material to a course, such as posting items to the discussion forum, but common practice involved less customization and less responsiveness than in the classroom setting. When compared with correspondence courses, online courses are certainly more flexible but when compared to classroom courses they are not as adaptable. Further research is required to explore methods and strategies that can be used to keep courses current and responsive.

Professors were able to clearly identify both advantages and disadvantages of online teaching. These findings might help users, course designers, and software developers more fully explore and expand on the inherent advantages of the medium. The way in which this can be done needs to be more fully explored.

Professors observed that some students preferred online courses and appeared to excel in this learning environment. The idea of "online learning communities" has been discussed by other researchers (Buckingham, 2003; MacDonald & Thompson, 2005; Meyer, 2004). Extensive content analysis and interviews with students in various contexts have expanded our knowledge of this topic, yet we still do not have a clear understanding of the factors involved. Why do certain students participate more online?

Does their learning style or personality play a role? Some researchers (Salmon & Giles, 1997) have suggested the use of a pre-test to help students assess whether they would do well in an online environment. Also, there is a need to explore how cues that are inherent in face-to-face teaching can be replaced or compensated for in an online environment.

Some students still seem uncomfortable learning online. It is often assumed that people have the necessary skills to learn online. However, this research suggests that there is a need to provide more support to online learners. A non-credit course to help familiarize learners with the process and make best use of such a format would be helpful. The need for such training and the use of such preparatory courses has been examined in other literature (Salmon & Giles, 1997; Hricko, 2002; Jones, 1996; Lynch, 2003; O'Regan, 2003; Stodel et al., 2006). Further research is needed in order to determine exactly what type of assistance would be most useful.

The level of structure provided to students and the accountability required is an important issue, given the concerns that have been raised by professors about high non-completion rates in distance education courses and programs. Some professors pointed out that establishing requirements, such as deadlines or a specified number of postings, makes online courses more demanding than less structured courses. More in-depth research will perhaps explain the high non-completion rate and explore strategies that can be used to address this issue.

Another disadvantage of online learning, which some say causes lower performance in online programs, is the potential for distraction. This idea that online students are often less focused would be a worthwhile area of study since it has not been explored in previous research. A number of pertinent questions that emerged from the

current research need to be answered: Are students freer to “wander” in online courses? Is “surfing the Internet” beneficial in instances where students are pursuing interests that have been sparked by the course? Can learning be packaged into limited and stand-alone courses? Do we need to adjust our views of learning based on the new technology? Will other pedagogical models evolve? Will new technology challenge the way we view the world and the environment in which we construct courses and assess student learning? An examination of student activities in online courses and how they are different from classroom activities would provide some valuable insights into these topics.

Professors talked about the extra time required to develop, teach, and evaluate online courses and the absorbing nature of the technology. This perception has the potential to slow adoption as professors feel they may be doing more work and not being properly compensated. While these problems are possibly of a transitional nature, it is important for the future adoption of online courses that professors are trained in course management methods that help limit the amount of time involved in online courses or compensated for the extra time required. Additional research should be pursued to explore methods that can be used to manage the time professors devote to online courses and explore options for dealing with this problem. Professors were also concerned that the time students spent on online courses was fragmented and this might have negative implications for their learning. The effects on students’ learning habits should be explored in terms of student learning outcomes.

The manner in which assessment is carried out online also needs further investigation. Issues around accreditation of learning and verification of the quality of programs may become more contentious as educational institutions that offer face-to-face

courses challenge the quality of online learning. In the future, invigilated exams may become less common because of the costs involved in organizing them in the various locations. Other options such as online tests, term papers, course work, or the use of testing centres might become more prevalent. As online courses become more mainstream, other methods of assessment may become more acceptable and commonly used. What is expected in terms of assessment of learning is likely to change as well. While some research is already being done in this area (Abrami & Barrett, 2005; Mason, Pegler, & Weller, 2004; Wadhwa, Shulz, & Mann, 2006), additional work is needed to explore the evaluation options that become available in online courses.

Another issue related to assessment arising from this research was the increased amount of time it takes to provide feedback on electronic versions of term papers and assignments. Most professors preferred to deal with hard copies. The idea that the nature of the task changes when the medium alters has been discussed in the scholarly literature (Birkerts, 1995; Kurzweil, 2000; Manguel, 1997; McLuhan, 1964; Norman, 1999; Rawlins, 1992; Tapscott & Caston, 1993). The findings from this research indicate that there is a need for new approaches, software, and hardware that allow quicker marking of electronically submitted assignments. Further research should be done into developing and integrating such tools into courseware packages and then encouraging their use by professors.

Wallace (2001), among others, has argued that people are less inhibited online because they are more anonymous. However, in online learning environments the same “freeing” dynamic may not be in effect because people may anticipate meeting each other again in the future. Studies have shown an initial class or cohort meeting can lead to more

productive discussion (MacDonald & Thompson, 2005). Administrators in programs where cohorts exist might consider holding an initial meeting or some other strategy, such as regional meetings, to allow students to get to know each other. Professors involved in this research suggested the use of residency periods, class meetings, and online strategies for building relationships within online programs or courses. Further research is needed to explore options that might be useful in enhancing the interactions in online courses. Possible ways of building more satisfying work environments for professors who teach online courses would also be a topic for further research.

The findings suggest that professors go through a series of stages in their adoption of online courses. Rogers (2003) identified five stages of adoption: knowledge, persuasion, decision, implementation, and confirmation. During each of the stages of adoption adopters may require different support services. Other theorists have also looked at the concept of adoption in terms of stages. For example, Hall and Hord (2005) established seven stages of concern and levels of use that were designed to help provide adopters with the kind of assistance that would be most useful to them. Havelock and Zlotolow (1995) presented the CREATER model that involves seven stages of adoption: Care, Relate, Examine, Acquire, Try, Extend, and Renew. While the evidence from both the literature and the data from this research suggest there are identifiable stages, they also propose it is difficult to determine what stage individuals are at and how other factors affect how they progress through these stages. The nature of these stages and the effect of outside influences on them should be further examined in the context of online courses.

When faced with a new technology human beings often try to use it in ways that emulate the old technology (Basalla, 1989; Marvin, 1988). Sometimes, experience and familiarity with another technology can be an inhibiting factor (Hughes, 1989; Norman, 1993). Moore (1999) discussed the importance of identifying groups of people who are most likely to adopt or who have the most to gain from adoption. In the context of the adoption of online courses, professors who have taught in other distance formats may be such a group. Also, professors who teach professionals with irregular schedules, such as nurses, as well as teachers, businesspeople, engineers, or graduate students might be viable targets for encouraging early adoption. In this research, the courses that had previously been taught by traditional distance education were among the first to be placed online. Further research to identify the “likely adopters” would be useful in facilitating early adoption in an institution.

In terms of professors’ attitudes changing when they teach online, the findings of this study indicate there is a period of disruption and then a settling down. The level of skepticism upon encountering new technology easily shifted into a supportive attitude. Most of the professors had more positive views towards online courses after they taught them. However, this was not always the case and some stopped teaching online. The reasons for discontinuance should be an area targeted for further research. Also, a longitudinal study of how professors’ views change as they teach online courses would provide valuable information that could facilitate future adoption.

This research supports the idea that professors are more likely to adopt an innovation when they have seen it used by someone in circumstances similar to their own. Some professors revealed they had learned some of their technical skills through

hands-on trials. It would be useful to determine if this is a characteristic of professors or if it is more about the way people learn different kind of skills. For example, are computer skills learned best hands-on while other abilities are learned in a more social way? Also, this research identified the development of some channels for the sharing of information related to the adoption of online teaching, such as the use of online communications, which need to be examined more fully through further research.

Noble (2001) considered that online courses have a negative impact on the job security of professors. The findings of this research point out that the circumstances involving university professors may be different from what Noble is predicting. University professors are different in significant ways than other professionals where technological innovations have resulted in a downgrading of workers' rights. Some professors in this study wanted to teach online courses and saw it as a way of enhancing their employment. Also, given their high social status and ability to influence public opinion, university professors are in a better position to control the impacts of changing technology on their terms of employment than many other groups in society. Given the accusations and concerns that have been raised in this regard and the lack of research evidence, it would be valuable to do an analysis of how the introduction of online courses is impacting terms of employment at various universities.

A number of areas for future research arise specifically related to the social constructivist theories examined in this research. Obtaining the perspectives of other relevant social groups such as employers, those involved in rural development activities, and various professional associations who have members who want to do university courses would provide valuable insights that could promote the adoption of online

courses. The technical frames that these groups have in terms of online courses should also be investigated. For example, how do factors such as age, gender, or subject area taught impact the technological frame of individuals and groups?

An investigation of the operations of power in the adoption of technology is also warranted. This research demonstrates that university administrators and others exerted power in different ways to either get professors to offer online courses or stop them from being offered. An analysis of power relationships would prove informative and provide guidelines for others wishing to influence the way online courses are offered at their institution. In terms of stabilization and closure, it would be useful to explore whether asynchronous online courses and the technology of online education are stabilizing and what the factors are that play a role in this. Another aspect of universities' social systems worthy of consideration is how professors are experimenting and being innovative with the courses they teach. Some thought research should be done to find out what strategies would encourage professors to continue to innovate after they have adopted the use of online courses.

Several professors noted the growing influence of DELT and the fact that this group is gaining control over what courses will be offered online. The increased influence of DELT meant that professors sometimes felt they were working for two employers. The presence of online courses has, to a degree, changed the administrative structures of the university. New positions and divisions have been created and power has shifted within the university due to the growth of online offerings. Further research to explore the structural and organizational changes happening at universities because of online courses would be useful in understanding the impact of this changing technology. Also, a

comparison of practices at various universities could offer worthwhile insight into the variations in services offered and help identify best practices for encouraging adoption.

Many professors remarked that they worked very closely with the instructional designer and this research highlights the importance of this relationship. Understanding this new dynamic is an important part of understanding how professors work changes when courses go online. Very little research has been done on the working relationship that develops between instructional designers, other professionals, and professors who teach online courses.

Concluding Comments

Qualitative researchers often use stories to convey the main theme or the core concepts of their research. In the attempt to answer the research questions of this study, has a story unfolded about the adoption of online courses at Memorial University of Newfoundland, and if so, what kind of story is it? Is it the story of unsung heroes who individually pushed change forward in the face of early adversity—the lone rangers that few recognized or had the opportunity to thank. Perhaps it is, in part, a tale of manipulative administrators who coerced professors to teach in a way they did not want to teach, as well as one of personal change as professors attempt to meet new demands that are being place on them by students in the presence of this emerging technology. Another possible story involves international intrigue as huge corporations attempt to use their power and influence to commercialize education for their personal gain. Is it a story of self-doubt and leaps of faith as professors teach online courses with no knowledge of their implications or are they the brave and courageous resistors caught in a fight against

the imposition of cold technology that dehumanizes education? And are such resisters modern Don Quixotes tilting at the latest technology?

The data from this study suggest that these are all possible interconnected subplots in the still unfolding saga of online courses at Memorial University of Newfoundland—a story that may be similar to those at other universities. The conclusion of this complex plot has not yet been written. Unlike in fiction, however, the characters in a real story can and do have a role in writing the parts they play and influencing how the story ends.

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Table 1
Summary of key findings related to societal factors

Finding	Significance
Professors are a relevant social group in the context of the adoption and use of online courses at universities. Individual professors described both advantages and disadvantages of using online courses. The main advantage noted by professors was increased accessibility for students and the main disadvantage was the lack of close personal contact with students.	This research provides evidence that professors weighed their views on the advantages and disadvantages of online courses to form a concept of "relative advantage" when deciding whether to teach online. This is in contrast with the dichotomized views that often exist in the current literature.
Professors provided insight into their impressions of another relevant social group, students, in relation to the adoption of online courses.	These findings provide a basis for assessing the accuracy of professors' understandings of students' views and provide insight into the "consumption junction" or "mediation process" of this particular technology.
This study documents the interaction between political factors, and nonhuman actors, such as geography and climate, in relation to the technology being examined.	This evidence supports the theoretical assertion that technologies carry with them political values in that they impact on the power structure within society. Such findings provide a basis for political involvement.
In terms of understanding the momentum of technology, professors' views about the future of university teaching are important. There was a general belief that classroom teaching would continue to be a major part of what universities do, despite evolving technology.	University professors, because of their involvement and closeness to this situation, provide valuable insight into not just the technical possibilities that are available but also the societal aspects that might impact on adoption.
One area where the momentum of the previous technology was evident was in student assessment. Changing student assessment became a contentious issue. When courses are put online, alternative methods of assessment were sometimes easier to use than those traditionally accepted in the classroom.	This study documents how professors are making decisions to change the way they assess student learning; it also illustrates how some professors have concerns about how this might compromise the quality of courses.
While professors recognized problems related to allowing economic factors to be part of the considerations, when deciding to offer online courses, they also considered the opportunities that might exist. They thought about opportunities from their own perspectives as well as impacts on students.	Rather than being "victims" of commercialization, some professors were willing participants in such activity. The general criteria they used to determine their willingness to participate involved either personal benefit or benefit to students.

Table 2

Summary of key findings related to the general institutional environment

Finding	Significance
Informal conversations with other professors teaching online courses were a valuable source of information for professors thinking about teaching online.	This finding emphasizes the importance of establishing a group of early adopters that can be a source of information for others. Those encouraging adoption should consider ways to foster such informal networks.
Professors were using information and communication technology to communicate with professors at other universities.	This finding indicates that Rogers' concept of "proximity" may need to be reconsidered in light of the ease of communication and the observability of this innovation at a distance.
Sessional professors sometimes had very little contact with other professors and often felt they were working in isolation.	This finding illustrates one of the negative consequences of universities changing their hiring practices, while not taking into account the needs of the newly constituted employees.
Professors noted the importance of opinion leaders and information from outside sources.	This recognizes the importance of "systems openness" and programs that encourage behaviour such as attendance at conferences and options such as visiting professors.
Some professors will push forward innovation without the support or encouragement of administration. In this context, professors closely guarded the level of autonomy they experienced.	It is often assumed that administrators will be the first to encourage employees to innovate. The situation at Memorial University clearly demonstrates that individual professors can be a source of innovative practice and there is value in creating an environment that allows and encourages individual innovation.
Aspects of the way this university was organized were identified as impeding innovativeness. For example, the employment practices and reward mechanisms within the academic environment did not encourage innovation in teaching.	This finding provides a detailed understanding of some of the reasons why professors do or do not innovate, which offers a basis for the development of policies and procedures to address this issue.
The introduction of online courses is causing changes in social structures at universities. Professors expressed DELT was becoming more powerful in terms of what courses were being offered and the way services were offered to students.	When courses are offered online, the way other services are offered must also change based on the new online student population. Having a centralized organization that coordinates course offerings redistributes a certain amount of power from the level of the faculty, department, and the individual professor.

Table 3

Summary of key findings related to formal institutional supports

Finding	Significance
A centralizing body within an organization, such as DELT at Memorial University, can facilitate change.	This research provides clear evidence to support the establishment of separate entities within business organizations as advocated by Christensen (1997) and also within educational institutions (Archer, Garrison, & Anderson, 1999).
This research documents the activities provided by DELT that professors view as important.	By documenting the services offered by DELT and how professors viewed them as important, this research adds to knowledge about the nature and importance of such supports.
The findings indicate that technical problems are less of a concern now than in the past, but new technical concerns seem to be arising related to the dependence of the professor on technical support people. This research identifies a developing issue related to what level of technical expertise professors should be expected to have and if they should be responsible for developing and designing their own courses.	This research provides insight into the under-explored area of how demands for technical assistance evolve. It also highlights some aspects of professors' independence and control of their own work as well as the new relationship between professor and instructional designers as they work together as part of a course delivery "team."
This research identifies the role of various individual change agents at the university and provides some documentation of the importance of that role.	While the role of individual change agents has been identified in other research, this research provides further evidence of how such a role is manifested in the context of online courses at a university.

Table 4

Summary of key findings related to the individual professors

Finding	Significance
The ways in which online courses are “discontinuous innovations” are documented and the difficulty of making such a role change is highlighted.	The insight provided by this research provides a basis for developing strategies and procedures to facilitate such a role change by university professors.
The very “nature” of class changes as the composition, discussion, and kind of interactions change.	By illustrating specific ways in which the nature of the task changes, this research provides a basis for developing online teaching practice.
The level of professors’ satisfaction with online courses was generally lower than that of those in classroom teaching, but higher than that of those teaching through correspondence.	While some scholarly writers have speculated that online courses and the use of technology would negatively impact professors’ work situations, this study presents research evidence of how this is happening in some instances.
Experience not only with other technology but also with innovating in other ways, were important indicators of willingness to adopt online courses.	Indications of innovativeness should be considered in identifying potential early adopters during the early stages of the introduction of online courses.
Once professors had taught an online course their impression of the format usually improved.	This indicates some professors may not have a good understanding of the nature and potential of online courses. Based on this information, those promoting adoption might want to conduct information campaigns and also offer special incentives for professors to teach their first online course.
Innovators and early adopters have different adoption processes than those who adopt later.	This research provides insight into exactly how these groups differ and provides a basis for developing different services for the various categories of adopters.
Professors had varied reasons for adopting the use of online courses. Some started teaching this way based on their own personal interest while others were subjected to “gentle” coercion. This research provides insight into how, even in the relatively free academic environment, employees were “persuaded” to adopt a technology.	This research illustrates, in detail, the techniques that can be used by administrators to encourage adoption of online courses and the nature of the decision that individual professors have to make. It emphasizes the nontechnical aspects of the decision-making process that are often overlooked in the current literature.

Table 5 *Generalizations about time and phases of the adoption of online courses*

Phase / Level of Analysis	Experimental Use	Early Introduction	Growth and Expansion	Stabilization (possible scenarios)
Individual Professor	Innovators, as described by Rogers, started to teach online courses. They did so out of personal interest and had a high level of technical ability.	The innovators were still teaching, experimenting, and now offering assistance to other professors in an informal way. More professors were looking for information about online teaching.	Professors who were less enthusiastic, and had fewer technical skills, were asked to teach online. They required more formalized supports.	- Younger professors who are comfortable with the technology start to teach this way. - Professors want control over the offering of online courses.
Institutional	The institution was unsure of the implications of this new technology and was starting to come to terms with its use.	Administrators started to target certain areas and push to have courses and programs offered online. More services started to be offered to professors teaching online and courses were becoming more standardized.	Organizational changes were happening at the university. A centralized unit was created to coordinate the offering of online courses and associated support services.	- Institutions will market their courses and programs to a wider geographic area. - Memorial University will attempt to use its experience to expand in this field. - Online offerings peak and the technology stabilizes.
Societal	Online courses were viewed as a curiosity in the context of the overall advancement of information and communication technology. They were viewed with some skepticism because of the prevailing view of what a university should be.	Various groups within society started to gain more information about online courses and how it would affect them. Some groups started to take action to protect their interests in the context of this emerging innovation.	Groups started to express their opinions about online courses and critics questioned their quality. Others remained enthusiastic about the technology and pushed for its continued development.	- Questions and concerns are raised about the quality of online education. Major issues include professional certification and transferability of credit. - New educational systems evolve based on continued advances in technology.

Figure 1. Variables determining the rate of adoption of innovations.

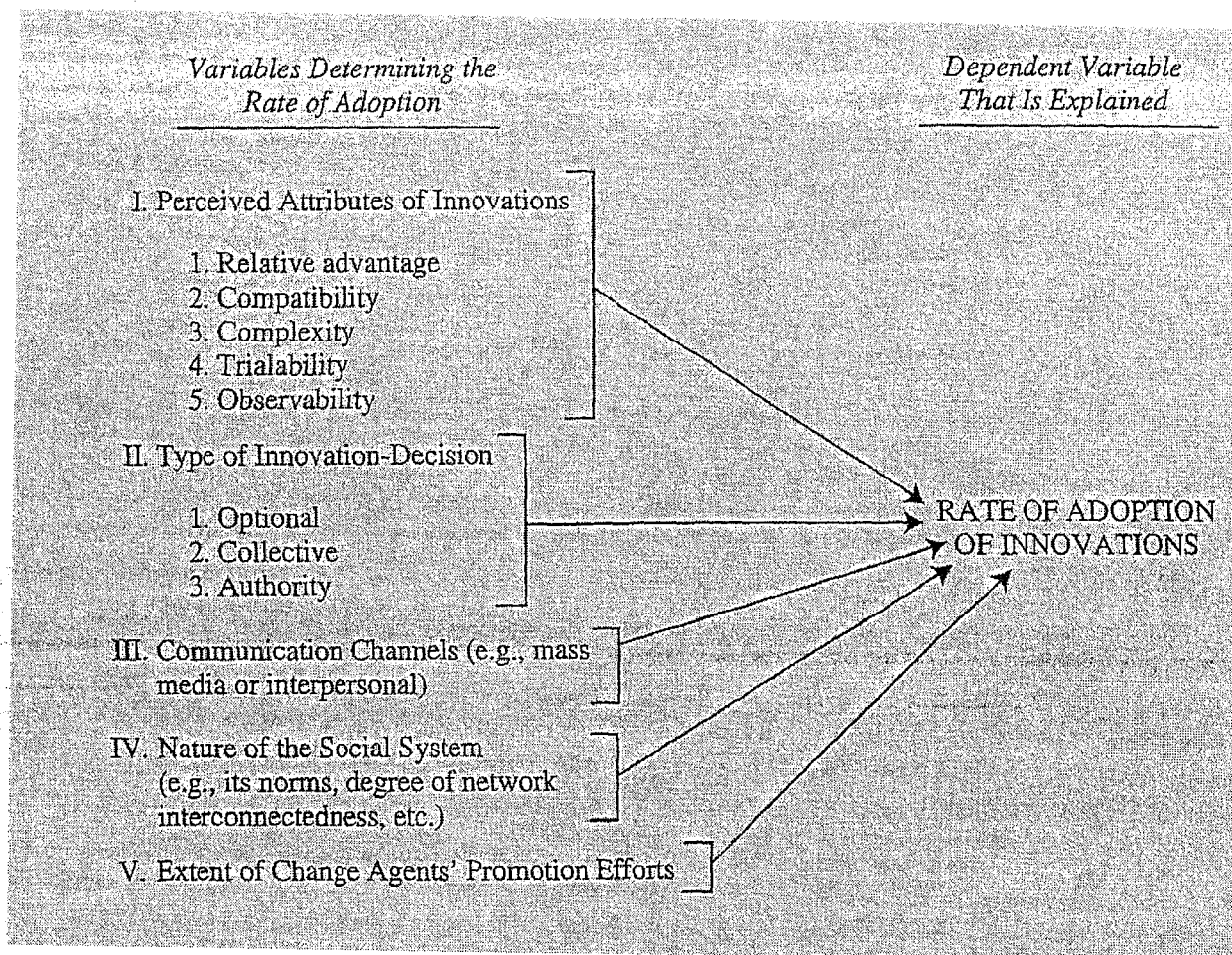
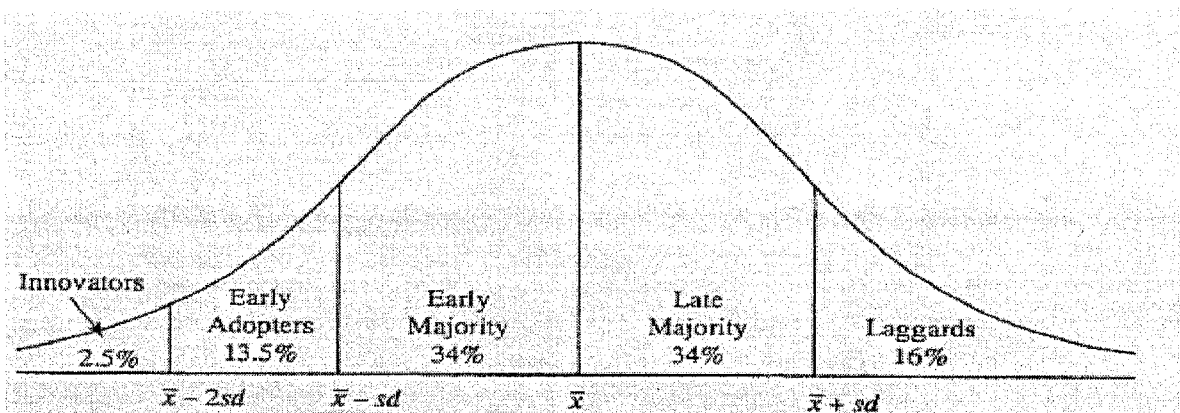


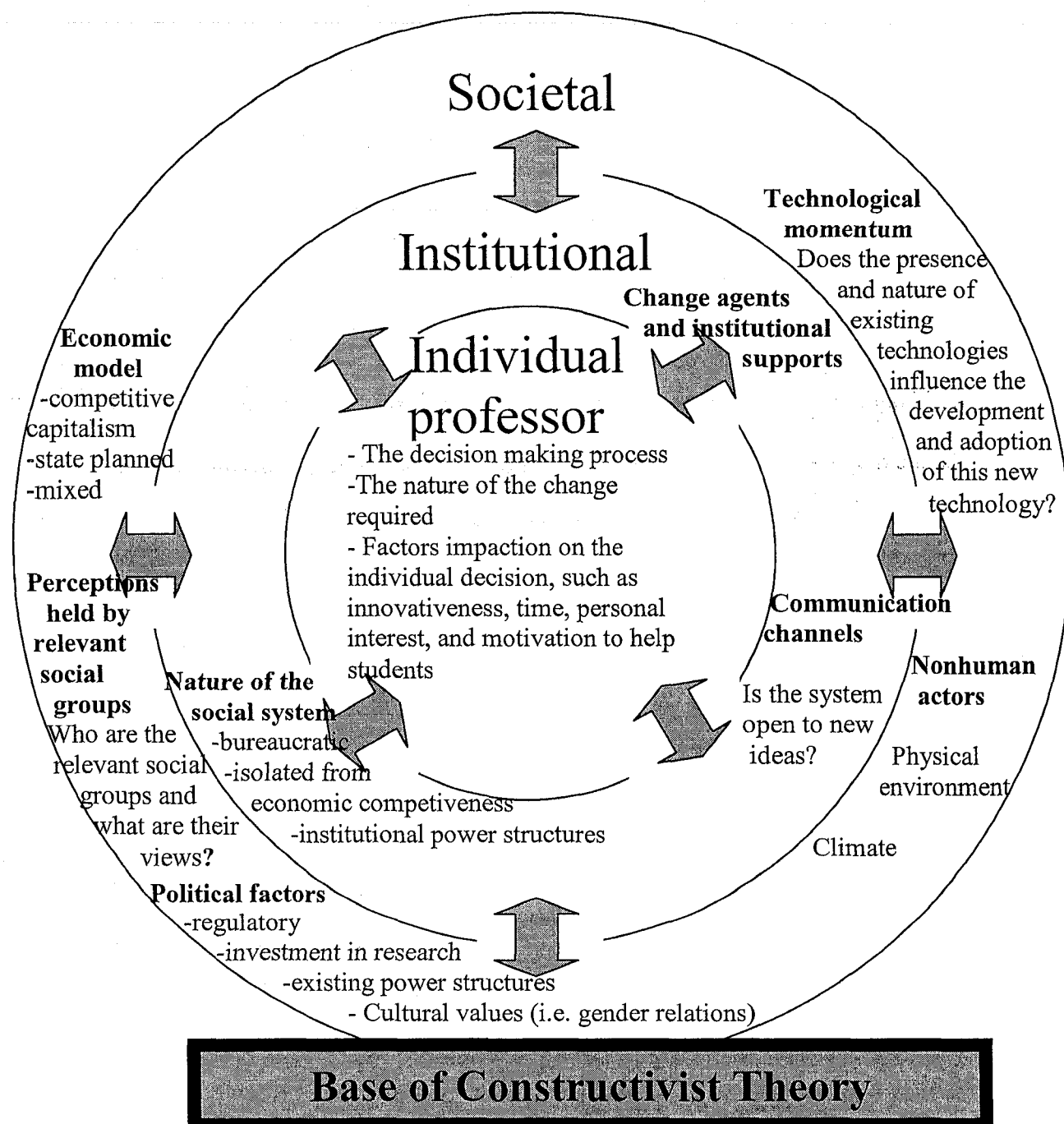
Figure 2. Adopter categorization on the basis of innovativeness.

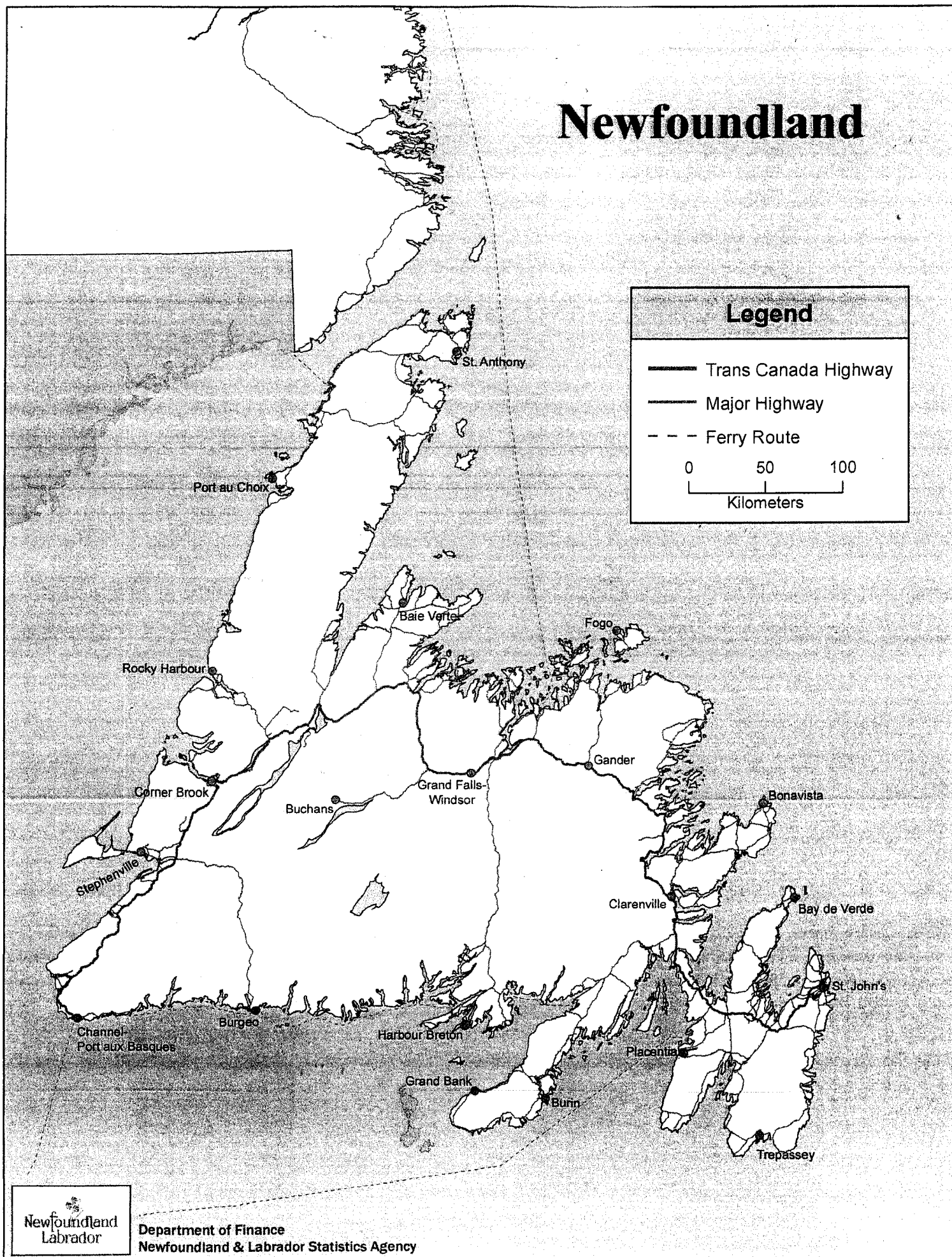


The innovativeness dimension, as measured by the time at which an individual adopts an innovation or innovations, is continuous. The innovativeness variable is partitioned into five adopter categories by laying off standard deviations from the average time of adoption ($\bar{x}$).

Figure 3. Conceptual framework of factors impacting professors' adoption of online courses.

This conceptual framework situates the adoption of asynchronous online courses by university professors in the context of societal, institutional, and individual factors. The diagram illustrates that the individual professor is making a decision to adopt the use of online courses within an institutional environment, which is also part of a larger social system. The connecting arrows between the different levels of analysis indicate that these are not isolated spheres; rather, they influence each other in an interactive way. Factors identified in the literature review are situated in each of these levels of analysis. This conceptual framework is situated on a base of constructivist theory.





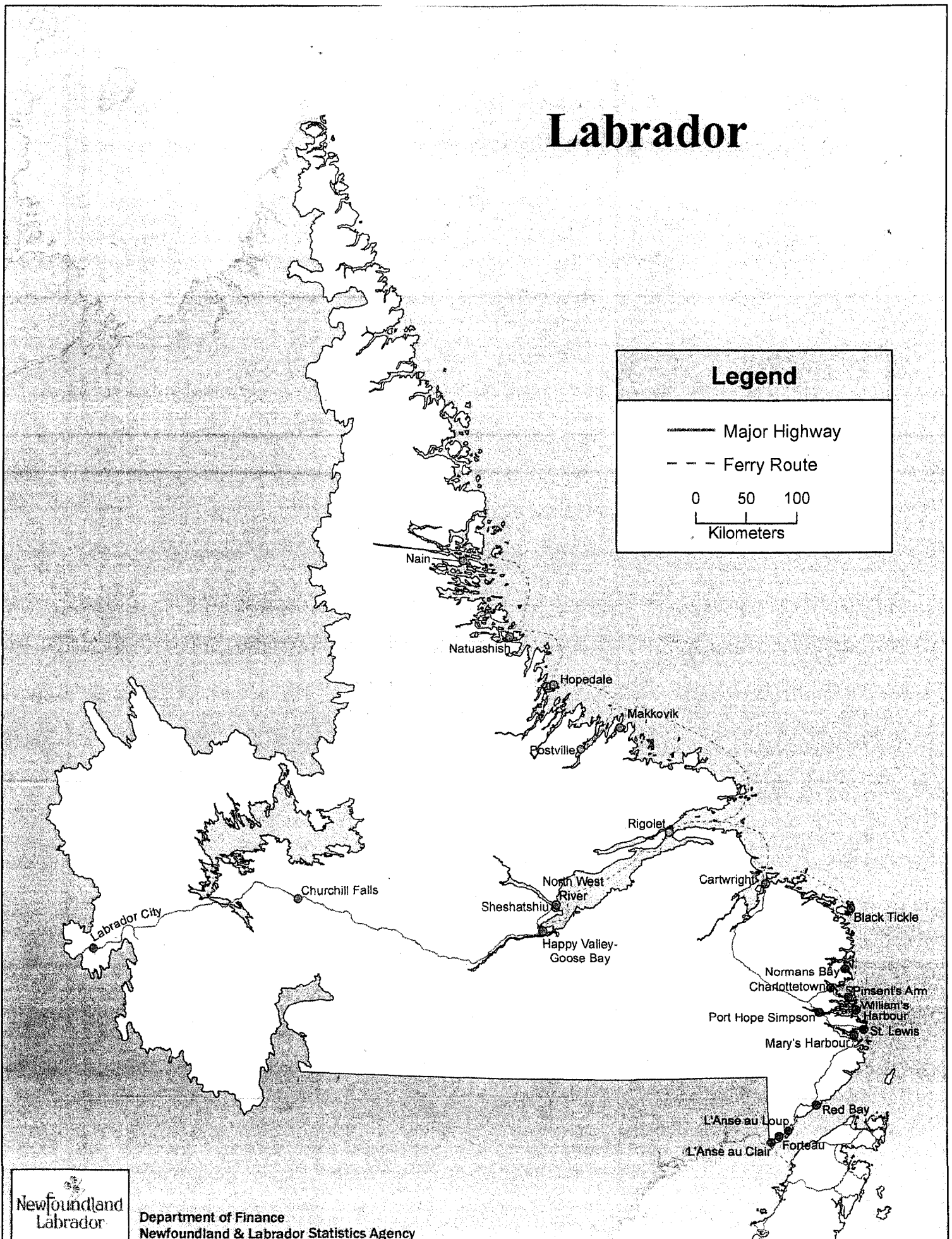
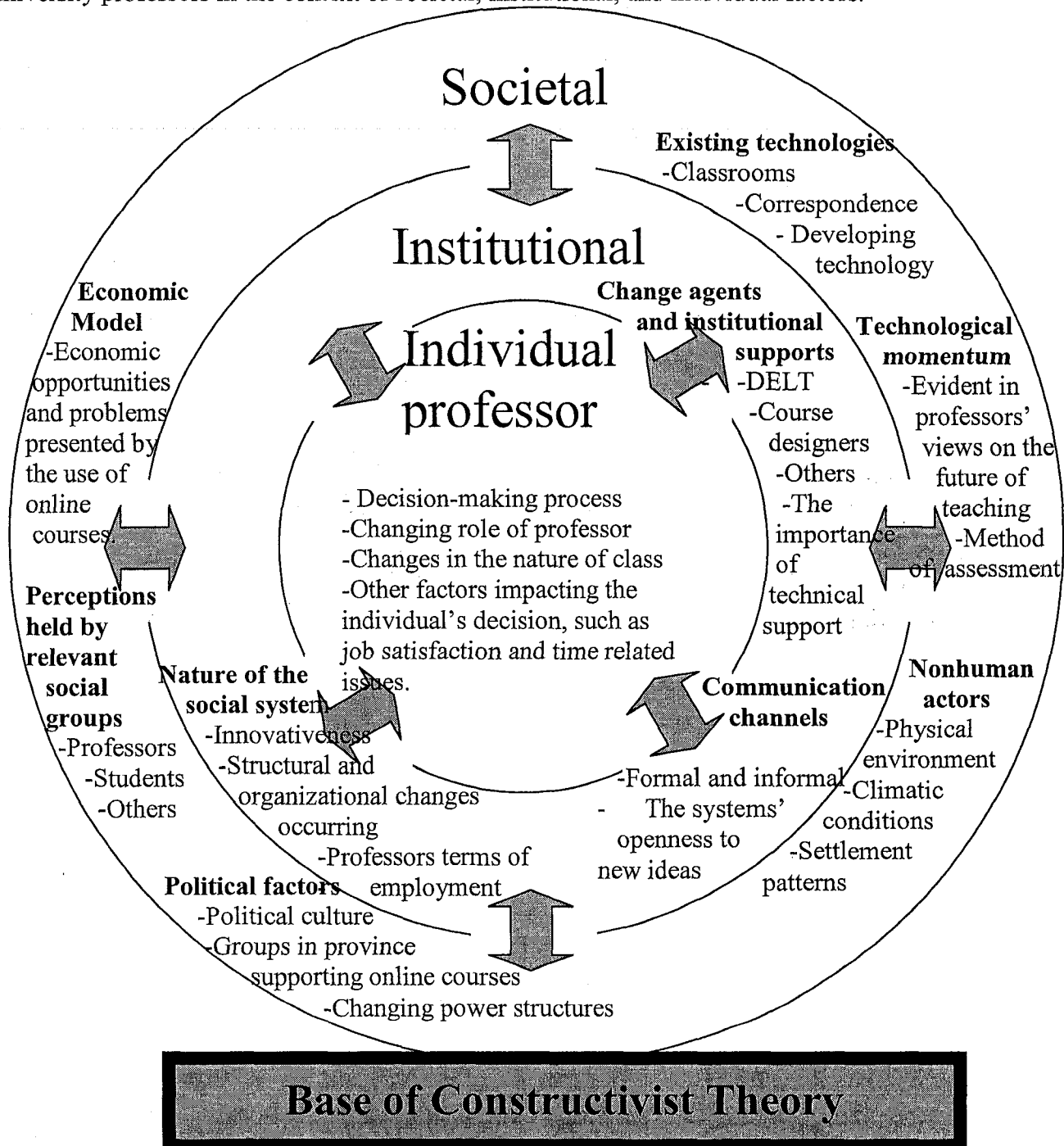


Figure 6. Analysis of the findings based on the conceptual framework.

When applied to the adoption of online courses at Memorial University, findings from this study provide insight into how each of these variables express themselves in this context. This framework situates the adoption of asynchronous online courses by university professors in the context of societal, institutional, and individual factors.



APPENDIX A INTERVIEW GUIDE

Type of innovation - decision

How did you come to teach a course over the Web?

What things motivated or discouraged you as you started to use Web courses?

When you were making the decision to use Web-based courses were you pressured in any way to do so? By administration? Other professors? Or was it your decision alone?

Communications channels

How did you first learn about Web-based courses? Where did you go to get more information?

Do you share information with other professors about Web-based courses?

Did you attend any kind of information or professional development session on Web-based courses?

Nature of the social system

Is there anything about the situation at MUN that helps or hinders professors in adopting the use of Web-based courses? Is innovation encouraged at MUN? How? Is there any pressure from administration, students or others to offer Web courses?

Are there any organizational changes happening at the university as a result of the use of Web-based courses?

Extent of change agents' promotion efforts

Has anyone been encouraging you to use Web-based courses?

Did anyone help you obtain the new knowledge and skills you require to offer Web-based courses? Did you receive formal training or was it through informal learning?

What could be done to encourage professors to use Web-based courses?

Perceived attributes of innovations

Thinking about the traditional role of the university professor: How has your work changed in relation to course preparation/design, course delivery and evaluation? What are some of the strengths and weakness of Web-based courses as a medium for teaching?

Has your perception of the use of Web-based courses changed? If so, how?

Has the use of Web-courses changed your terms of employment in any way? Do you feel you have less control over your work? How do you see your role in relation to course designers?

Has the introduction of Web-based courses left you doing things that require less skills? Different skills? Are the skills you used as a professor in the past now becoming irrelevant?

Are you cooperating with other professors to develop course material in any way because of Web-based courses? Is there more use of material developed by publishing companies? Do you see commercialization becoming more of a problem when Web-based courses are used?

Did you do any experimentation with information technology before moving to a full Web-based course?

How do you think students feel about the use of Web-based courses?

Conclusion

Are there any other problems or opportunities you see developing for professors as a result of the introduction of Web-based courses at universities?

Is there anything that I have not asked that will help me understand how the introduction of Web-based courses is affecting your work?

APPENDIX B

LETTERS OF REQUEST AND CONSENT FORMS

APPENDIX C

STAGES OF CONCERN QUESTIONNAIRE

Introductory Page Concerns Questionnaire

Name: _____

The purpose of this questionnaire is to determine what people who are using or thinking about using innovations are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who range from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0 1 2 3 4 5 6 7
This statement is somewhat true of me now.	0 1 2 3 4 5 6 7
This statement is not at all true of me at this time.	0 1 2 3 4 5 6 7
This statement seems irrelevant to me.	0 1 2 3 4 5 6 7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with Web-based courses. We do not hold to any one definition of this innovation, so please think of it in terms of your own perception of what it involves. Since this questionnaire is used for a variety of innovations, the name Web-based course never appears. However, phrases such as "the innovation," "this approach," and "the new system" all refer to Web-based courses. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with Web-based courses.

Thank you for taking time to complete this task.

Questionnaire items							
0	1	2	3	4	5	6	7
Irrelevant	Not true of me now		Somewhat true of me now			Very true of me now	
1. I am concerned about students' attitudes toward this innovation.	0	1	2	3	4	5	6 7
2. I now know of some other approaches that might work better.	0	1	2	3	4	5	6 7
3. I don't even know what the innovation is.	0	1	2	3	4	5	6 7
4. I am concerned about not having enough time to organize myself each day.	0	1	2	3	4	5	6 7
5. I would like to help other faculty in their use of the innovation.	0	1	2	3	4	5	6 7
6. I have a very limited knowledge about the innovation.	0	1	2	3	4	5	6 7
7. I would like to know the effect of reorganization on my professional status.	0	1	2	3	4	5	6 7
8. I am concerned about conflict between my interests and my responsibilities.	0	1	2	3	4	5	6 7
9. I am concerned about revising my use of the innovation.	0	1	2	3	4	5	6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0	1	2	3	4	5	6 7
11. I am concerned about how the innovation affects students.	0	1	2	3	4	5	6 7
12. I am not concerned about this innovation.	0	1	2	3	4	5	6 7
13. I would like to know who will make the decisions in the new system.	0	1	2	3	4	5	6 7
14. I would like to discuss the possibility of using the innovation.	0	1	2	3	4	5	6 7
15. I would like to know what resources are available if we decide to adopt this innovation.	0	1	2	3	4	5	6 7
16. I am concerned about my inability to manage all the innovation requires.	0	1	2	3	4	5	6 7

0	1	2	3	4	5	6	7
Irrelevant	Not true of		Somewhat true of me now			Very true of me now	
	me now						

31. I would like to determine how to supplement, enhance, or replace the innovation.

0 1 2 3 4 5 6 7

32. I would like to use feedback from students to change the program.

0 1 2 3 4 5 6 7

33. I would like to know how my role will change when I am using the innovation.

0 1 2 3 4 5 6 7

34. Coordination of tasks and people is taking too much of my time.

0 1 2 3 4 5 6 7

35. I would like to know how this innovation is better than what we have now.

0 1 2 3 4 5 6 7

Demographic page

1. What percent of your job is:
teaching ____% administration ____% other (specify) ____%
 2. Do you work: full time ____ part time ____
 3. Female ____ Male ____
 4. Age: 20-29 ____ 30-39 ____ 40-49 ____ 50-59 ____ 60-69 ____
 5. Highest degree earned:
Associate ____ Bachelor ____ Masters ____ Doctorate ____
 6. Year degree earned: ____ 7. Total years teaching: ____
 8. Number of years at present university: ____
 9. In how many universities have you held full time appointments?
one ____ two ____ three ____ four ____ five or more ____
 10. How long have you been involved in Web-based courses, not counting this year?
Never ____ 1 year ____ 2 years ____ 3 years ____ 4 years ____ 5 years or more ____
 11. In your use of Web-based courses, do you consider yourself to be a:
nonuser ____ novice ____ intermediate ____ old hand ____ past user ____
 12. Have you received formal training in the use of Web-based courses (workshops, courses)?
yes ____ no ____
 13. Are you currently in the first or second year of use of some major innovation or program other than Web-based courses?
yes ____ no ____
- If yes, please describe briefly.

Thank you for your help

APPENDIX D

DEMOGRAPHIC INFORMATION

Table 6

Data Collection Summary

Prof. Code	Interview	SoC / Stage	Demographic
1	✓	✓ 0	✓
2	✓	✓ 4	✓
3	✓	✓ 0?*	✓
4	✓	✓ 4	✓
5	✓	✓ 3	✓
6	✓	✓ 5	✓
7	✓	✓ 2	✓
8	✓	✓ 0	✓
9	✓		
10	✓	✓ 5	✓
11	✓	✓ 0?	✓
12	✓	✓ 0	✓
13		✓ 6	✓
14	✓	✓ 5	✓
15	✓	✓ 0	✓
16		✓ 4	✓
17	✓	✓ 6	✓
18	✓	✓ 5	✓
19	✓	✓ 4	✓
20	✓	✓ 5	✓
21	✓	✓ 1	✓
22	✓	✓ 6	✓
23	✓	✓ 2	✓
24	✓	✓ 0	✓

25		✓ 1?	✓
26		✓ 6	✓
27	✓	✓ 0	
28	✓	✓ 0	✓
29	✓	✓ 4	✓
30		✓ 5	✓
31	✓	✓ 5	✓
32		✓ 3	✓
33	✓	✓ 4	
34	✓		
35		✓ 5?	✓
36		✓ 0	✓
40	✓		
41	✓		
42	✓		
43	✓		
Totals	32	34	32

*Note: Where I have used a question mark by the CBAM stage the results are not clear because of a tie in the peak score.

(i) Description of population

Tables 7 to 14 provide some information about the demographics of the participants in the study. There was an even split of males and females and most were employed full-time at the university. A majority of the participants (19 of 32) were over 50 years old, a majority of them (20 of 32) had a doctorate and the remainder had master's degrees. More than half of the professors reported 20 years or more teaching experience and only 5 had less than 10 years teaching experience. The professors in the study had various levels of experience and taught in varied subject areas.

Table 7. *Age of participants by sex*

	20-29	30-39	40-49	50-59	60-69
Male			5	9	2
Female		2	6	6	2
Total		2	11	15	4

Table 8. *Employment status by sex**

	Full time	Part time
Male	13	3
Female	11	5
Total	24	8

Table 9. *Employment status by age*

	20-29	30-39	40-49	50-59	60-69
Full Time		1	10	11	2
Part Time		1	1	4	2
Total		2	11	15	4

Table 10. *Highest degree by sex*

	Master's	Doctorate
Male	1	15
Female	11	5
Total	12	20

Table 11. *Total years of teaching by sex*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15-19	20+
M				1			1					1		1	2	10
F	1				2					3		1			1	7
Total	1			1	2		1			3		2		2	3	17

Table 12. *Years involved in teaching Web-based courses by sex*

	less than 1	1	2	3	4	5 or more
Male	1	2	4	2	1	6
Female	1	3	4	3	1	4
Total	2	5	8	5	2	10

Table 13. *Subject area taught by sex*

	Nursing / Medical	Business	Education / Physical Education	Faculty of Arts / Social Work	Science / Math
Male	1	3	6	3	2
Female	6	2		6	
Total	7	5	6	9	2

* For table 8 and 9 subject categories were developed that include the subject areas of all professors interviewed.**Professors 032, 035 and 036 were not included because the questionnaire was returned anonymously and the subject area taught could not be determined.

Table 14. *Subject area taught by age*

	20-29	30-39	40-49	50-59	60-69
Nursing / Medical			3	1	3
Business		1	2	2	
Education / Physical Education		0	2	4	
Faculty of Arts / Social Work		1	4	4	
Science / Math				1	1
Total		2	11	12	4

**Professors 032, 035 and 036 were not included because the questionnaire was returned anonymously and the subject area taught could not be determined.

(ii) SoC Data by demographics

Tables 15 to 23 provide information related to the demographic characteristics of professors who are at various stages of concern. Most of the professors were at the higher levels of the 7 stages of concern or had a peak score at stage 0, which is usually interpreted as that of a comfortable user who is concerned about other things. There did not seem to be any dramatic difference between the SoC of males and those of females demonstrated in Table 11. One quarter of the participants involved in the study was part-time professors and the other three quarters were full time. There did not seem to be any dramatic differences in peak stage scores based on employment status or degree earned. There did seem to be a pattern of more advanced SoC stages based on years of teaching experience and years involved in Web-based courses.

Table 15. *SoC Stage by age*

SoC Stage	20-29	30-39	40-49	50-59	60-69	Totals
0		1	1	5	2	9
1			2			2
2			2			2
3				2		2
4			3	2		5
5			2	4	2	8
6		1	1	2		4

Table 16. *Stage by sex*

CBAM Stage	Male	Female
0	5	6
1	0	1
2	1	1
3	1	1
4	4	2
5	4	4
6	2	2
Totals	17	17

Note: Although there is no demographic sheet for Prof. 027 and 033 the sex of the participant was known so it was included in the chart.

Table 17. *Stage by job status*

CBAM Stage	Full-time	Part-time
0	7	2
1	1	0
2	2	0
3	2	0
4	4	2
5	6	2
6	2	2
Totals	24	8

Note: Prof. 027 and Prof. 033 were included because I knew their job status from the interview information.

Table 18. *Stage by highest degree earned*

CBAM Stage	Master's	Doctorate
0	3	7
1	0	2
2	1	1
3	1	1
4	1	5
5	3	5
6	3	1
Total	12	22

Table 19. *Stage by years of teaching experience*

Stage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 - 19	20+
0					1							1			1	6
1										1						1
2										1					1	
3														1		1
4							1					1			1	2
5										1				1		6
6	1			1	1											1
Total	1	0	0	1	2	0	1	0	0	3	0	2	0	2	3	17

Note: Of those with more than 20 years, professors have 27, 25, 40, 25, 32, 37, 35, 20, 35, 26, 31 and 35 years experience teaching.

Table 20. *Stage by how many years involved in Web-based courses*

CBAM Stage	Less than 1	1	2	3	4	5 or more
0	1	2	2		2	2
1		1				1
2		1		1		
3			1	1		
4			5			
5				2	1	5
6	1		1	1		1
Total	2	4	9	5	3	9

Table 21. *Stage by self assessment of Web-based experience*

CBAM Stage	nonuser	novice	intermediate	old hand	past user
0		2	4	2	1
1			2		
2		1	1		
3			2		
4		1	2	2	
5			4	4	
6		1	2	1	
Total		5	17	9	1

Table 22. *Stage based on if they had received training (workshop or course)*

Stage	Yes	No
0	5	4
1	2	0
2	1	1
3	1	1
4	3	2
5	6	2
6	3	1
Total	21	11

Notes: Prof. 006 indicated that he conducts such workshops so I put him in the 'yes' column. Prof. 016 pointed out that the training was minimal on the survey.

Table 23. *Stage by subject area taught*

CBAM Stage	Nursing / Medical	Business	Education / Physical Education	Faculty of Arts / Social Work	Science / Math
0	3	1	3	2	1
1	1				
2			1	1	
3				1	
4	1	2	1	2	
5	3	1	1	1	1
6		1	2	2	
Total	8	5	7	9	2

Note: Profs. 032, 035 and 036 were not included because they responded anonymously and the subject area could not be determined.