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FACTORS INFLUENCING TECHNOLOGY ADOPTION: A CASE STUDY OF FOREIGN LANGUAGE INSTRUCTORS

BY

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Dedication

I dedicate this dissertation to my husband and best friend who listened when I was frustrated and stressed, understood my challenges, and helped me overcome them. The successful completion of this dissertation is due to his continuous support, understanding, and encouragement throughout this doctoral journey. I think it's time for us to start a new journey now.

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Abstract

This study investigated the factors that influence foreign language instructors to adopt the use of educational technology as a supplement to their on-campus face-to-face classes. In particular, this study explored the various educational technologies that the foreign language instructors in one public post-secondary institution used to meet their teaching and learning objectives and the factors that affected their technology selection decisions. Previous literature has shown that the field of language education has historically included educational technology but few studies have explored the role that conversations amongst instructors can have on their technology adoption decisions. This study, therefore, utilized social network theory to explore the effects of foreign language instructors' conversations with one another on their technology adoption decisions. The findings revealed an emerging trend for instructors who had adopted a greater number of technologies to be in a central position in their departmental social network influencing the spread of information and subsequently helping promote technology to their peers. However, interview data concluded that the most influential factors for technology adoption are not the result of these social networks or conversations, but are consistent with Davis' Technology Acceptance Model instead.

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Key Words and Definitions

Adopters: An instructor who has decided to use a particular technology and who continues to use it.

Conversation: A formal or informal oral exchange of substantive ideas, opinions, or information between two or more individuals.

Coordinators: Faculty members who are responsible for designing a course that is taught by a number of instructors. They may also have teaching responsibilities.

Educational technologist: A staff member who offers support and guidance to faculty members who use educational technology.

Educational technology: New tools that support teaching and learning including audio and video media, computer software, and communication tools via the Internet.

Faculty members: Instructors at the post-secondary level, either with a professorship title or an instructor title.

Foreign language: A language other than the national language or, in Canada, any language other than English.

Innovation: An idea, practice, or object that is considered to be new to an individual (Rogers, 1995).

Instructors: Teachers who instruct at the post-secondary level but do not necessarily have professorship titles.

Learning management system (LMS): Web-based environment with integrated communication, assessment, content, and student management tools.

Non-Adopters: An instructor who does not choose to experiment with using a particular technology or who does not choose to continue using a particular technology after experimenting with it.

Perceived ease of use: The degree that someone believes they can use a technology without much effort (Davis, 1989)

Perceived usefulness: The degree that someone believes a technology would enhance job performance (Davis, 1989).

Social network: A social structure made up of individuals who communicate with one another and who may influence one another.

Technology adoption: Choosing to use a particular technology (i.e. tool) for teaching purposes.

Chapter One: Introduction

The twentieth century witnessed the gradual introduction of technological innovations that helped revolutionize teaching strategies and approaches (Wang, Wang, Fang, & Lin, 2010). From the early days of the phonograph and radio to the current days of interactive white boards and web-based course delivery, technology has affected instruction. Over the past several decades in particular, technology has progressed at a rapid pace in North America, with educational technologies that aid in teaching and learning becoming more common in classrooms. As new technologies become available for educational use, educators have to choose whether to adopt the latest technology in their teaching, allow others to experiment with it first, or turn away from the technology available. In the 1980s and 1990s, with the introduction of the personal computer as a teaching aid and easy access to video and audio educational media, many educators were encouraged to begin experimenting with computer-assisted technologies and audio and video resources to enhance their instruction and better meet their teaching objectives (Kabata, Wiebe, & Chao, 2005). With the rise of the Internet in the late 1990s and early 2000s, educational technology became more complex as software, video, and audio were integrated. Communication technologies, such as asynchronous discussion boards and synchronous chat, have further expanded the potential of educational technology to enhance student interaction and collaboration (Cho & Carey, 2001; Godwin-Jones, 2003). With various educational technologies available for enhancing the teaching and learning experience, instructors must determine whether they will adopt their use within

their teaching practice. While administrators can purchase and provide new technologies for instructors to use in their teaching, the technology adoption process is more complex (Del Favero & Hinson, 2007; Rogers, 1995). Instructors have to select the technology they wish to adopt from those available and determine whether they wish to be a pioneer in using the given technology at their institution, wait until others have experimented with it first, or perhaps not adopt it at all.

Previous research has been conducted on the use of educational technologies in the classroom, particularly in relation to foreign or second language education (Campbell, 2007; Clarke, 1918; Ranalli, 2008). Such studies have focused on the various technologies that have emerged and language instructors have adopted to improve their students' learning experiences. From early technologies, such as the phonograph (Clark, 1918), to online discussion boards (Campbell, 2007), and to recent simulations and virtual environments (Ranalli, 2008), some foreign language instructors have embraced the teaching and learning opportunities available through technology. The literature review in the following chapter will further discuss the role that technology has played in foreign or second language instruction over the decades. The factors that have influenced certain instructors to incorporate technology in their teaching have shown that collaboration amongst colleagues can help with the success of technology adoption and that one's social network could influence decisions around experimenting with new teaching approaches such as incorporating educational technologies (De Lima, 2008; Kessler & Plakans, 2008; Roxa &

Martensson, 2009). As will be discussed in Chapter Two, social networks have influenced students' technology adoption (Tan, 2009) and have influenced instructors' decision-making processes around teaching approaches (Niesz, 2007; Roxa & Martensson, 2009). Previous studies have explored the use of various technologies to enhance teaching and learning in the language classroom. Asynchronous discussion boards, for example, have helped students with oral and written practice outside of the classroom (Cho & Carey, 2001; Harrison, 1998; Jimin, 2007). Web-based learning management systems have also helped instructors disseminate course content to students outside of class and have provided a portal for students to connect with different learning tools (Kabata et al., 2005; Siekmann, 1998). More recently, interactive white boards have engaged students with course material within the classroom by providing innovative activities (Gray, Pilkington, Hagger-Vaughan, & Tomkins, 2007). Although previous studies have investigated the use of technology in language teaching, several aspects of the area of face-to-face social networking between foreign language instructors remain relatively under-researched. These include the influence of collaboration amongst foreign language instructors on teaching practices and the effect of their professional social networks on technology adoption. This study, therefore, investigated the role, if any, that professional social networks or conversations amongst colleagues have on the adoption decisions of foreign language instructors.

The remainder of this chapter will provide an overview of the components of this research study. The next section will introduce the research purpose and

the study questions pertaining to the factors that influence foreign language instructors to use a particular educational technology: a learning management system. After the overview of the research purpose and questions, the research setting and study participants will be briefly described followed by an introduction to the methodological approach and discussion of the delimitations and limitations. The chapter will end with an overview of the remaining chapters of the dissertation.

1.1 Research Purpose and Questions

In the current era of post-secondary education, instructors and students have access to a wide variety of educational technology or learning tools that can be incorporated with traditional face-to-face classroom instruction. As mentioned in the previous section, such educational technology could include tools used in the classroom or web-based learning tools that can be used in a computer lab or outside of the classroom during the students' study time. In post-secondary institutions, instructors have access to a number of different educational technologies that they could choose to incorporate in their teaching (Kabata et al., 2005; Wang et al., 2010). They have access to web-based learning management systems, social software such as blogs, wikis, and discussion forums, multimedia such as digital audio and video, and animations and simulations to teach complex concepts. Blogs help students become familiar with writing for an audience and providing constructive criticism to one another (Smith, 2008; Tryon, 2006). While blogs are mostly for independent public writing, wikis provide an avenue for collaborative public writing where multiple students can contribute to a written

assignment (Wei, Maust, Barrick, Cuddihy, & Spyridakis, 2005). Discussion forums typically give students an opportunity to asynchronously communicate with one another through text; but audio-based boards, such as Wimba Voice Board, allow for asynchronous audio exchange as well (Cho & Carey, 2001; Kabata et al., 2005). Streaming digital video of lectures allows students to use their own time for watching and listening to their class lecture and for replacing face-to-face lecture time with interactive group activities (Foertsch, Moses, Strikwerda, & Litzkow, 2002). Interactive simulations help students, particularly language learners, practise speaking and writing to one another in authentic virtual environments (Ranalli, 2008). However, access to such educational technologies is not enough to spark interest and use (Kessler & Plakans, 2008). Other factors such as training and support from colleagues may help encourage language instructors to learn to use a new technology and incorporate it in their teaching.

Higher education leaders, such as senior administrators of post-secondary educational institutions, deans, or department heads often provide some level of financial resources for educational technologies (Garrison & Kanuka, 2004), whether by providing support staff or by purchasing and hosting the technologies at the local campus. In this way, they hope that the instructors will use the available technologies to enhance student collaboration and interaction, help students understand complex concepts, and motivate learning. Senior administrators in higher education are also faced with the challenge of implementing strategies that will facilitate technology diffusion and acceptance

across their institutions (Abrahams, 2010). Despite the affordances of technology and the policies specified by the senior administration, there continues to be resistance at many institutions (Roberts, 2008). Such resistance may be due to factors such as whether the use of a technology motivates students (Lam, 2000) or is convenient for students to use (Arnold, 2007) and whether faculty have access to training (Chen, 2008; Kessler & Plakans, 2008).

This study was situated in a public post-secondary institution in Western Canada and all foreign language instructors in this institution were invited to participate. This study investigated the factors that influence foreign language instructors' decisions to integrate educational technology such as a learning management system, WebCT Vista, with their on-campus face-to-face instruction and in particular, the role that their conversations with one another have on their technology adoption decisions. Discovering the influential factors can help senior administrators in higher education to implement the necessary strategies for successful technology adoption each time a new technology becomes available and is considered essential for enhancing teaching and learning. From the phonograph to computer-assisted language instruction and now to online communication technologies, foreign language educators have incorporated educational technologies in their teaching in one form or another (Rogerson-Revell, 2007). While previous research has shown that foreign language instruction is an academic discipline that has historically used educational technology extensively (Kabata et al., 2005; Salaberry, 2001, Wang et al., 2010), studies on technology adoption from the perspective of foreign language

instructors in higher education institutions have been limited. Such studies have, however, discovered that a technology's popularity (Li & Walsh, 2010), convenience for students (Arnold, 2007), capability to motivate students or present material alternate modes (Lam, 2000), and the training available (Chen, 2008; Kessler & Plakans, 2008) influences technology adoption decision. In addition, a small number of studies have shown that collaboration and mentorship (Davis, 2005; Mwaura, 2003) can influence technology acceptance by instructors and professional social networks can affect teaching strategies in general (Niesz, 2007; Roxa & Martensson, 2009). This study, therefore, further adds to the scholarship of technology adoption amongst foreign language instructors by exploring the role, if any, that professional social networks or conversations amongst instructors has on the technology adoption decisions of foreign language instructors at one post-secondary educational institution. Research on educational technology for enhancing language instruction and technology adoption studies will be discussed in *Chapter Two: Literature Review*.

To address the purpose of the study outlined above, a case study research project explored the technology adoption process of foreign language instructors in one public post-secondary institution. The study's methodology is detailed in *Chapter Three: Methods*. The four specific research questions were:

i) How actively is the learning management system, WebCT Vista, used by foreign language instructors to facilitate their intended student learning outcomes?

ii) In what ways does communication with colleagues about educational technology, or their professional social networks, affect foreign language instructors' technology adoption decisions?

iii) According to foreign language instructors, what are the factors that influence their adoption of a learning management system, such as WebCT Vista, or other educational technologies?

iv) To what extent and in what ways can the factors determined in questions two and three be used to predict an instructor's decision whether to accept or reject a new technology?

The following section introduces the research setting and briefly describes the participants in the study.

1.2 Research Setting and Participants

This study took place at a public post-secondary institution in western Canada. Social software (i.e. blogs and wikis) and learning management systems (i.e. WebCT Vista) were hosted and supported locally on the institution's campus. Furthermore, there were units across the campus that provided support for various instructional technologies. Hands-on training sessions, trouble-shooting, and pedagogical guidance were available for all instructors. Assistance with technical hardware was also available for all instructors to help ensure that their computers were equipped and functional for the various learning technologies they wished to employ. Hence, instructors could receive training and expert advice from educational technologists on how to use various educational technologies.

Since this study focused on foreign language instruction, all foreign language instructors in the research setting were invited by e-mail to participate in this study, regardless of whether they were adopters or non-adopters of the institution-wide learning management system, WebCT Vista. The learning management system, WebCT Vista, had been available as an educational tool for instructors for the past several years. Prior to WebCT Vista, a previous version of WebCT was available for instructors from the early 2000s. In addition to the learning management tools within WebCT Vista, there were additional plugins such as wikis and asynchronous audio boards available for instructors to use to help meet their learning objectives. According to data collected from the 2009 academic year, approximately 14% of courses offered by the Faculty of Arts at the research setting had a WebCT Vista component (Macfadyen, 2010). Hence, there continued to be many instructors who had not yet adopted its use. This study explored the factors that influence instructors' adoption of WebCT Vista and other educational technologies they had chosen to use by focusing on a select group of instructors, foreign language instructors, who historically have integrated educational technology with their teaching (Salaberry, 2001). The learning management system, WebCT Vista and the research setting are discussed further in *Chapter Three: Methods*. The next section briefly introduces the methodology selected for this study.

1.3 Methodological Approach

A mixed method case study approach was optimal for the purpose of this study in order to probe deeply and investigate the phenomena in its real, specific

context. Although generalizations are limited from this small, bounded sample, some trends may be identifiable about the wider population (Cohen, Manion, & Morrison, 2007). A case study is ideal when a "how" or "why" question is being asked about a contemporary set of events that the researcher does not have any control over (Yin, 2009). This approach was best for this study, as it helped determine how foreign language instructors' specific social networks affect their technology adoption, a contemporary issue over which the researcher has no control. In addition, a case study is an inquiry that "investigates a contemporary phenomenon in depth and within its real-life context" (Yin, 2009, p. 18). Initial observational data collection provided some background on which instructors have adopted WebCT Vista and which have chosen not to use it. In addition, it helped determine which specific tools instructors are using within WebCT Vista, such as discussion boards and weblinks, among others, which helped determine how actively instructors were engaging with the various tools available. However, in order to obtain a deep understanding of the factors that influence foreign language instructors to adopt or reject a technology such as WebCT Vista, in-depth conversations or interviews with participants were required. These interviews facilitated the understanding of each participant's professional social network and whether these collegial relationships affected technology adoption decisions or whether there were other factors that may have influenced instructors. Results were analyzed to determine whether there were any similarities or differences among participants' responses. After the analysis, parallels were drawn that can be beneficial for senior higher education

administrators to make decisions about the strategies required for successful technology adoption. More details about the interviews and the chosen methodological approach are discussed in *Chapter Three: Methods*. The following section discusses the delimitations and limitations of this study.

1.4 Delimitations and Limitations

The scope of this study determines its delimitations. As mentioned earlier, the study sample was drawn from foreign language instructors in one post-secondary institution and, hence, the results were focused on a small sample of foreign language instructors. Furthermore, since the study focused on foreign language instructors in particular, other instructors at the post-secondary institution were excluded from the study. Hence, the extent of the generalization of the results is restricted due to the small and confined sample.

In addition to the delimitations, this study also has some limitations that cannot be controlled or changed. The primary limitation refers to the accuracy of study results since these depended on instructors' own perspectives and experiences. Instructors indicated the colleagues who they considered to be in their social network and provided their opinions on factors that influence technology adoption. As study participants' responses were based on their memory of events and discussions with others, there may be some error in comments. Further information about the limitations of the study and how future studies can address them are discussed in *Chapter Eight: Summary, Conclusions, and Future Directions.*

1.5 Overview of the Dissertation

There are eight chapters in this dissertation. Following this introductory chapter, the next chapter, *Chapter Two: Literature Review,* provides a review of the relevant literature. This chapter reviews studies on educational technology in foreign language instruction, examines technology selection and adoption processes and explains the role of social networks in adoption decisions. This overview helps identify the knowledge and research gaps that provide an argument for the significance of this research proposal.

The third chapter in this proposal, *Chapter Three: Methods,* provides an overview of the mixed-method approach used in this study. It describes the research setting and participants and discusses the research design including the data collection and analysis techniques.

Chapter Four: The Use of WebCT Vista and Social Networks reports the results pertaining to the use of WebCT Vista and other educational technologies. The second half of this chapter presents the results of the social network analysis of the academic departments and the patterns discovered.

Chapter Five: Conversations about Educational Technology presents the content analysis of the interview transcripts regarding the types of conversation the study participants reported that they had with their colleagues about educational technology.

Chapter Six: Factors that Influence Technology Adoption further reports on the content analysis of the interview transcripts by specifically presenting the factors that the study participants considered important for selecting technology.

Chapter Seven: Discussion reviews the results presented in the previous three chapters and discusses how they relate to previous studies and to what extent and in what ways they can be used by higher education leaders to develop strategies for enhancing technology adoption at their institutions.

The final chapter of the dissertation, *Chapter Eight: Summary, Conclusions, and Future Directions* summarizes the overall results, discusses the delimitations and limitations encountered that future studies can address, and draws conclusions on the significance of the study for the broader higher education community.

Chapter Two: Literature Review

This chapter reviews and synthesizes the literature relevant to the research questions of the study. There are three sections to this chapter and the first begins by providing a historical account of educational technology in foreign language instruction. Literature in the field of foreign language instruction shows that technology has helped language teaching and learning for a number of decades and, thus, it is not an entirely new concept for language instructors (Rogerson-Revell, 2007). The chapter continues with an account of four educational technologies that have been particularly prevalent in foreign language instruction over the past few years: asynchronous discussion boards and blogs, asynchronous audio boards, learning management systems, and interactive white boards. The first three technologies were available to the study participants and the first research question explores which tools foreign language instructors in this study used the most. Learning management systems, specifically, are described and discussed. This is particularly important since observational data collection involved looking at how study participants use WebCT Vista, the learning management system available at the educational institution where the study took place. In addition, a relatively new technology, interactive white boards, is introduced providing insight into the types of technology that may become more common in language instruction. This section of the chapter concludes with an overview of technology selection frameworks, in particular Bates' (2000) ACTIONS framework. The second section of the chapter describes technology selection and adoption frameworks providing a background to the essence of this

study, which was determining the factors that influence technology adoption. Relevant literature indicates that one factor is the need for collaboration amongst colleagues. This factor relates to the third section of this chapter that synthesizes the literature on social networks and network thresholds. This chapter concludes with a discussion on the characteristics of social networks and how they have been significant in technology adoption of students. Since there is limited literature on the technology adoption of foreign language instructors and, specifically the effects of their social networks, this study addressed that gap.

2.1 Historical Account of Educational Technology in Language Instruction

Over the decades, language instructors have been exposed to a variety of technologies that have benefited language teaching by helping meet teaching and learning objectives. The phonograph, radio, movie projector, gramophone, tape recorder, television, videocassette recorder, integrated language laboratory, computer, and more recently the Internet are all technologies that, at some point, have been used for language teaching purposes (Guo, 2010; Salaberry, 2001). During the early twentieth century, phonographs were used to help teach pronunciation. According to Clarke (1918), recorded discs used on the phonograph allowed students to listen repeatedly to native speakers of the language of study. This was particularly useful when the instructor was not a native speaker of the language and, hence, did not have native-like pronunciation, or if the students required additional listening exercises and had access to a phonograph outside of class time. Following the introduction of the phonograph in language teaching, the radio became an important tool for distance education

delivery in particular. In the early 1930s, language instruction through the radio became popular for those who did not have the time or financial means to attend a university (Bolinger, 1934). Grammar instruction and listening dialogues would be broadcast on the radio by the local university and supplemented with a required textbook. The radio was an instrumental tool for language instruction for many decades. By the 1970s, it was used in the foreign language classroom to provide "intensive instruction in listening and speaking as well as reading and writing" (Garfinkel, 1972, p. 162) and provided an avenue to incorporate commercials, humor, and drama in language instruction (Garfinkel, 1972). Advancing from the radio era, the television combined audio and video resources for the foreign language classroom. With audio recordings of native language speakers and visual graphics, such as graphic intonation patterns, students could learn complex or unfamiliar pronunciation (Gottschalk, 1965). By looking at the intonation patterns while listening to the audio recordings, students begin to understand the way the sounds are produced and can compare their own imitated rendition with that of the recording. Like television, film, first as filmstrips and later as videos, supplemented language instruction by presenting the "cultural, historical, and geographical background of the foreign language" (Lottmann, 1961, p. 178). Watching a video that takes place in an authentic setting and following a culturally authentic storyline, students learned the connection between the language and the culture and depending on where the film takes place, may have been introduced to different dialects or accents.

Initially, the rise of the computer in language teaching in the 1970s and 1980s, termed Computer Assisted Language Learning (CALL), was predominantly used for supplementary drill and practice exercises and translation tests (Harrison, 1998; Jimin, 2007). Such computer-based exercises allowed students to work through material at their own pace, using the computer keyboard to input answers that the computer would automatically mark (Curtin, Clayton, Finch, Moor, & Woodruff, 1972). As Curtin et al. (1972) indicate, the computer was used for individually paced exercises and for timed vocabulary translation drills that would help students improve the speed and accuracy of their translations. Such computer-assisted exercises remained popular until the introduction of the Internet and the new learning opportunities that it provided emerged. The next section discusses the rise of the Internet and its impact on language teaching and learning.

2.2 Rise of the Internet in Language Instruction

The introduction of the Internet and communication technologies allows for authentic learning environments (Harrison, 1998; Son, 2007) as instructors began to emphasize "real language use in a meaningful, authentic context" (Jimin, 2007, p. 109). Authentic real-life language learning environments integrate cultural awareness with language communication. Students practise communicating in their language of study while engaging in activities that help them learn about the language's culture as well (Osuan & Meskill, 1998). Incorporating new technologies that help create authentic learning environments can have motivational effects if properly designed to meet students' individual

learning needs (Guo, 2010). Students who are tired of traditional teaching approaches, such as textbook and drilling exercises, find learning with new technologies more meaningful and more interesting (Jimin, 2007) since internet based resources provide varied and current information through text, sound and visuals (Osuna & Meskill, 1998). However, as Hoven (2006) posits, "it is important to remember and consider the needs of learners in actually utilizing these materials" (p. 16). Computer activities can help meet students' individual learning needs by providing learning materials at different competency levels and allowing students to learn at their own pace (Jimin, 2007). Hence, the use of the computer can help students meet their learning objectives by providing them with the supplemental activities they require. Over the past decade in particular, new technologies have begun to emerge that are beneficial for many academic disciplines, including foreign language instruction (Cho & Carey, 2001; Kabata et al., 2005; Wang et al., 2010). Such technologies include asynchronous text-based discussion boards or blogs, asynchronous audio boards (i.e. Wimba Voice Board), learning management systems, and interactive white boards. Each of these technologies was available to participants in this study and will be discussed in the following sections beginning with asynchronous text-based discussion boards and blogs.

2.3 Asynchronous Discussion Boards and Blogs

Communication technologies such as asynchronous discussion boards and blogs provide new avenues for students to practise their communicative language skills (Cho & Carey, 2001; Harrison, 1998; Jimin, 2007; Levy, 2010). Such new

communication technologies have affected approaches to language teaching and learning (Hoven, 2006) and brought the need for radical change in teaching practice (Harrision, 1998). Many instructors have turned to asynchronous discussion boards for students' written exchange (Godwin-Jones, 2003; Van Deusen-Scholl, Frei, & Dixon, 2005). These discussion boards allow for course discussions to take place anywhere and at anytime (Cho & Carey, 2001). Hence, collaboration and course discussion are no longer confined to the time constraints of the classroom as they can continue virtually via a discussion board. Similarly, asynchronous course blogs provide an online environment to extend class time for reading and writing practice as well as a forum for sharing opinions and personal reflections (Levy, 2010). Students and instructors can post comments to each other whenever they choose providing a more flexible teaching and learning approach. By discussing course content on a discussion board, students improve reading and writing skills: if they write in the language of study, instructors can provide feedback on their grammar and spelling (Cho & Carey, 2001). Moreover, the asynchronous nature of a discussion board or a blog allows students who may be shy or not confident in their language skills to take the time to develop their thoughts and words before writing their response to the rest of the class (Levy, 2010). As Campbell (2007) posits, providing language students with the opportunity to communicate asynchronously with one another increases their participation since many of the inhibiting factors of face-to-face communication are removed. Furthermore, asynchronous discussion boards and blogs can

facilitate collaborative communication. Such collaboration and interaction sit well within the theoretical paradigm of social constructivism.

Within constructivism, knowledge is seen as an interpretation of reality as learning occurs by reconstructing concepts allowing students to make better sense of their experiences (Davis & Sumara, 2003). In addition, knowledge construction is an interactive process rather than an individual one (Ng, 2008) and learning occurs when there is interaction and cooperation with peers or scaffolding from an expert in the field. According to Vygotsky (1978), students are in their zone of proximal development, which is the distance between being able to complete a task with the help of peers and being able to complete the task independently. When students are in their zone of proximal development, they are gradually mastering a task with the help of others. Constructivism focuses on students' ability to actively create their own knowledge as they engage with meaningful and authentic activities (Driscoll, 2000) rather than merely acquiring knowledge from an instructor (Ng, 2008). Hence, "they become the creators not just the receivers of knowledge" (Jimin, 2007, p. 111). Through collaboration with peers, students understand the point of view of others. If there is diversity in the group in terms of ethnicity, geographical origin, religion, or gender, then students will learn about the cultural differences of one another and learn about the characteristics of different populations (Wang & Hsua, 2008). This is particularly useful in the foreign language classroom where culture and language are often taught together. Through collaborative exercises, students have the opportunity to guide their own learning. Working in groups, students assign the tasks to be completed, reason

through the problem as data is collected and arrive at a solution collaboratively (Driscoll, 2000). Such collaboration in foreign language learning helps students communicate with one another in the language they are learning while completing authentic problem-based activities. Asynchronous discussion boards are useful for supplemental discussion and communication amongst students as they allow students to work on an assignment together but at different points in time (Dasgupta, Granger, & McGarry, 2002). Such discussion boards were available to instructors in this study through the learning management system, WebCT Vista, which will be discussed later in this chapter. Asynchronous audio-based discussion boards, namely Wimba Voice Board, briefly introduced at the beginning of this chapter, follow the same constructivist principles of text-based discussion boards but instead have audio capability. Students and instructors can post audio recordings for each other, allowing for pronunciation and listening practice. The instructors in this study had access to Wimba Voice Board, which is an audio-based discussion board integrated with WebCT Vista and is discussed in the following section.

2.4 Asynchronous Audio Boards (Wimba Voice Board)

Wimba Voice Board is an asynchronous board similar to text-based asynchronous discussion boards discussed in the previous section. However, just as its name implies, Wimba Voice Board allows students to record and post voice messages to the instructor and to one another allowing for oral assignments to be conducted online and for more advanced students to practise or present oral conversations (Kabata et al., 2005). Instructors can give feedback to the students

using the Wimba Voice Board allowing students to hear the instructor's correct pronunciation repeatedly in order to improve their own pronunciation (Cho & Carey, 2001). Such personal feedback with correct pronunciation is difficult to provide to everyone in a classroom due to time constraints. Without comments from their instructor, students may not know their pronunciation errors and, therefore, may not correct themselves. With limited face-to-face instructional time, instructors must limit the amount of time they allocate for in-class speaking exercises. Hence, an audio-based asynchronous discussion board allows for further pronunciation practice with instructor feedback outside of class time. In addition, Wimba Voice Board allows students to listen to their own recordings before posting them if they wish and they can compare their own postings to those of their peers (Van Deusen-Scholl et al., 2005). Using the Wimba Voice Board outside of class time means that the instructor can facilitate other activities in class (Kabata et al., 2005). Furthermore, shy students or those who are uncomfortable speaking in front of the class have less anxiety about oral practice when they are completed asynchronously online (Cho & Carey, 2001; Kabata et al., 2005). Similar to a text-based asynchronous discussion board, students can take time to select the correct words and practise their pronunciation before posting an oral comment to the discussion board. In addition to asynchronous audio boards, technology is available for synchronous audio communication as well. Speaking with peers or with the instructor in real-time can help create more intimacy in the class as comments and emotions are shared immediately (LaPointe, Greysen, & Barrett, 2004). As with the asynchronous discussion board,

synchronous discussions can extend class discussion outside of class time or can be used for online office hours where students can verbally ask questions to their instructor online and receive immediate responses. Synchronous audio technologies were available to the instructors in this study. However, at the time of the study, very few had considered experimenting with it. Instead, some of the instructors had asked their students to use the asynchronous Wimba Voice Board for online practice exercises or for submitting oral assignments. Postings were made asynchronously so that students and instructors could respond to each other whenever they wish. This study explored how often the Wimba Voice Board is incorporated into language teaching and learning in the research setting. As mentioned at the end of the previous section, the Wimba Voice Board can be integrated with a learning management system, such as WebCT Vista. This allows it to be more accessible by students and easier for instructors to manage. Learning management systems are discussed in the following section.

2.5 Learning Management Systems

There are a variety of open-source learning management systems, such as Moodle and Sakai, and commercial products, such as WebCT and Blackboard, available for educators to use. Learning management systems (LMS) allow instructors to provide content, assessments and communicative activities over the Web and without necessarily having advanced web-editing skills (Kabata et al., 2005). Course organization, communication, and assessment are integrated together in a single online environment (Siekmann, 1998). An LMS typically has a suite of educational tools such as quiz databanks, asynchronous discussion

forums, synchronous chat rooms, and folders for instructors to upload course notes and supplemental resources for students. In addition, other learning tools can be embedded to enhance the teaching and learning experience. The post-secondary institution in this study provided all instructors with access to the LMS, WebCT Vista, which included the common teaching and learning tools as well as additional applications. For example, Wimba Voice Board, discussed in the previous section, is a stand-alone application that, when embedded within a LMS "facilitates instructors' management of the course and gives students access to all of their course components in one location" (Kabata et al., 2005, p. 239). Hence, students only need to login to one learning environment, where they will find all the tools for their required courses. These web-based systems are customizable to some extent so that instructors can select which tools they wish to use for their particular courses (Siekmann, 1998). From the tools available to them through WebCT Vista, some of the instructors in this study had the ability to select the tools they wished to use to supplement their on-campus instruction. Hence, their learning management system environment was unique to their teaching and learning objectives and their comfort with using various technological tools. As will be discussed in the following methods chapter, this study investigated the types of tools that foreign language instructors use within WebCT Vista as well as other technologies available external to the LMS. The following section introduces an educational technology, the interactive white board, considered to be innovative at the time this study occurred. However, the relative novelty of this technology also meant that there was little published research relating to the use

of interactive white boards. The next section discusses some of the preliminary literature on its uses.

2.6 Interactive White Boards

In addition to the communicative technologies and learning management systems discussed in the previous sections, the interactive white board was an emerging educational technology at the time this study occurred. These white boards are connected to the instructors' computer allowing the instructor to share online resources, such as educational games or activities, with the students in-class (Gray et al., 2007). Such interactive online resources can be assigned to students independently in a computer lab; however, completing activities in front of the class using an interactive white board and overcoming errors publicly can help increase students' confidence and empowerment in the language they study (Johnson, Ramanair, & Brine, 2010). In addition, the capacity for interactive white boards to display content means they can essentially replace the chalk and dry erase marker boards (Gray et al., 2007) as they capture and project whatever the instructor writes or does on the connected computer. However, unlike chalk and dry erase marker boards that require instructors to turn their back to the students while writing on the board, interactive white boards allow instructors to face the class while showing or manipulating objects or text already created on the connected computer. In language acquisition, it is helpful for students to see their instructor's facial expressions and non-verbal cues while they are discussing a concept on the board (Johnson et al., 2010). Although there has been some published reports on the use of this technology, the interactive white board was a

new innovation for the instructors in this study that most did not know about it and had therefore not yet considered adopting it.

Several educational technologies available to enhance language teaching and learning have been discussed so far in this chapter. It is often difficult, however, for instructors to know how to select which technologies to employ in their teaching. The following section discusses this challenge and provides some suggestions based on previous literature.

2.7 Technology Selection

Present day educational technologies can help students meet their learning objectives by providing collaborative and authentic learning environments where students can practise their communication skills in their language of study. The authenticity of such activities engages and motivates students, encouraging them to practise their foreign language and ultimately meet their learning objectives. Adopting new technologies in teaching is not an easy task and some instructors can therefore resist adopting new educational tools because it is felt that they require too much preparation and organizational time (Jimin, 2007). In addition, instructors often do not possess the skills to effectively incorporate educational technology in their teaching. Instructors who have effectively taught from a podium in a classroom may not be able to successfully select technology to incorporate in their teaching (Zheng, 2005). In order, therefore, for instructors to make the most suitable technology choices for their courses, they need to be informed about the current technologies available.

Selecting appropriate technologies for instruction can be complex and frustrating without a framework or set of criteria to consider (Bates, 2000). In 1988, Bates developed the ACTIONS framework to help educators select technologies for their specific educational context. This framework has the following seven distinct criteria listed in order of importance: access, costs, teaching and learning, interactivity and user-friendliness, organizational issues, novelty, and speed (Bates, 2000). Following this framework, instructors can determine which technology to select. For example, on the one hand, an instructor may choose not to use a given technology because it will not be easily accessible by the students or it may be too costly for an educational institution to purchase. On the other hand, an instructor may choose to use a specific technology because it is very user-friendly, has a novelty effect because it is cutting-edge, and does not require any additional funding to employ. With the vast number of technologies available, language instructors can use the criteria outlined in the ACTIONS framework to determine which technology will be most suitable for their teaching. The process of selecting appropriate technology often occurs after the instructors have decided to adopt technology in general in their teaching practice. The process of technology adoption is the topic of the following section.

2.8 Technology Adoption

At today's post-secondary institutions, students are often more tech-savvy than their instructors, who may not possess the computer literacy or technical skills to include educational technologies in their teaching (Del Favero & Hinson, 2007). Unless instructors have a personal drive or inclination to develop their

computer skills, technology is often not used at all or not to its potential. Realizing the affordances that educational technologies can offer for the enrichment of teaching and learning, many academic administrators have recently developed core policies that include educational technology (Conole, 2010) and have provided financial resources for its use (Garrison & Kanuka, 2004). It is therefore important for instructors to understand the potential of the available technologies and to incorporate them in their teaching when appropriate. Despite the policies and administrative support, there continues to be some resistance to the use of educational technology in some institutions (Roberts, 2008). If administrators are aware of the factors that influence instructors' adoption or rejection of technology, they are in a better position to provide the necessary opportunities and resources to facilitate greater technology integration in teaching and learning. Factors such as the need for proper training, collaboration amongst instructors, and mentorship, can be learned from research studies exploring technology adoption as discussed below.

2.9 Training and Confidence

When instructors feel that technology is too complex and difficult to learn, they may reject it entirely (Oncu, Delialioglu, & Brown, 2008). Technology training is often required to dispel rejection and to give instructors the self-confidence that they are able to learn how to use it (Del Favero & Hinson, 2007; Dusick &Yildirim, 2000; Kessler & Plakans, 2008). This study explored the factors that influence technology adoption. Such factors could include adequate technology training.

Del Favero and Hinson (2007) conducted a study in various disciplines at three southern state colleges in the United States on instructors who chose to attend training sessions on a web-based course management system: Blackboard. Study results showed that the training sessions increased instructors' self-confidence in the use of the course management system and in their ability to apply their knowledge to other educational technologies (Del Favero & Hinson, 2007). Similarly, Kessler and Plakans (2008) conducted a study on the correlation between instructors' self-confidence in technology and their integration of it in their teaching. Seven English as a Second Language (ESL) instructors with varying confidence levels in CALL participated in the interviews in this study. Those who were highly confident in using technologies credited their own personal interest for their comfort level while the less confident instructors indicated their appreciation for training and practice sessions, despite their overall disinterest in educational technologies (Kessler & Plakans, 2008). Furthermore, interview results indicated that the contextually confident instructors (i.e. those who learned how to apply a particular technology to a specific context) used CALL in the most integrated and appropriate ways possible, while the highly confident instructors typically used CALL the least and typically in an unplanned and unconnected manner (Kessler & Plakans, 2008). Thus, high confidence and interest in using technology in general does not necessarily mean that the technology would be used effectively in the classroom. Less experienced instructors, either contextually confident or less confident, attempted to learn how to use the technology appropriately and apply it to their education contexts.

Finally, results also indicated that good written instructions for the use of the technology, practice time, and communities of practice helped instructors learn to use the technologies and ultimately adopt it for their teaching (Kessler & Plakans, 2008). The study conducted by Kessler and Plakans (2008), shows that when providing support for technology adoption, it is important to provide training, practice time, and a collaborative environment for instructors to share ideas and support one another. Arnold's (2007) qualitative technology adoption study with 173 foreign language instructors from 32 different post-secondary institutions reported that the majority of the participants used online technology to share materials with their students and chose to use a technology because it was convenient for students. Lam's (2000) qualitative study with 10 language instructors showed that most instructors chose to use a technology if it enhanced their students' learning experience by presenting material differently or having the capability to motivate students. Interviews with instructors in this study determined the factors that, according to them, support technology adoption. Such factors are discussed later in *Chapter Six: Factors that Influence Technology Adoption* and may include adequate training, collaboration, convenience for students, or a technology enhancing the learning experience. The effect of collaboration specifically on technology adoption, according to previous studies, is discussed in the next section.

2.10 Communities of Practice and Collaboration

A community of individuals usually refers to a group of people who interact, collaborate, and support one another. Individuals who are part of a

community have a sense of belonging to a group and share the same values as others in the group (Unger & Wandersman, 1985). Likewise, a community of practice of professionals consists of "people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting" (Wenger, McDermott, & Snyder, 2002, p. 4). A group of instructors, for instance, may form a community of practice to discuss teaching strategies and techniques, which will help with their professional development. They may not teach a course together or work together on a day-to-day basis. Instead, they will meet because they value their interactions and exchanges as they share information and advice with one another (Wenger et al., 2002). Thus, such communities are about the collective process of learning something (Wenger, 1998) as instructors share ideas and innovative teaching approaches with one another.

Communities of practice and collaboration amongst instructors have been demonstrated to influence technology selection and adoption (Foulger & Williams, 2007; Kessler & Plakan, 2008). Davis (2005) conducted a study that further supports the need for collaboration. In his study, Davis (2005) investigated the implementation and adoption of a particular technology in one foreign language department at a public research university in the United States. Through maximum variation sampling, 12 participants from the foreign language department were chosen for the study. Interview results showed that collaboration among stakeholders, namely the instructors, graduate students, and computer developers, and the effective and skillful publicity of technology adoption

throughout the university helped make the technology adoption successful (Davis, 2005). According to Davis (2005), the "pride of ownership felt by making the users of the materials their creators as well" (p. 167) helped encourage technology adoption.

In a similar technology adoption study, Mwaura (2003) explored the factors that influence faculty members' decisions to adopt instructional technologies. With purposive sampling of 31 faculty members in a technology workshop, her interview data showed that 26 of the participants who adopted the technology collaborated with colleagues and received mentoring from administrators. This is comparable with Davis' study, showing that collaboration amongst colleagues can influence technology adoption. Instructors adopt technology at different paces based on their comfort level and interest. There are two key adoption models that are relevant to this study: Davis' Technology Acceptance Model and Rogers' Diffusion of Innovation models. As this study specifically explored technology adoption processes, both of these models may be relevant to the adoption process amongst the participants in this study. The following section discusses these models.

2.11 Technology Adoption Process

As technologies are developed by computer programmers, software engineers, and technicians and distributed amongst the public, individuals have the option of embracing and adopting the available technologies or choosing not to use them. Some choose to experiment with the technologies as they become readily available, while others wait until their peers have begun to use them first.

The factors that influence the decision to adopt or reject a technology and the patterns that emerge when technologies enter society and become widely accepted over time, are the essence of technology adoption processes and models. Davis' (1986) Technology Acceptance Model (TAM) was developed in order to explain why individuals chose to adopt the use of computers in particular. It "posits that two particular beliefs, perceived usefulness and ease of use, are of primary relevance for computer acceptance behaviors (Davis, Baggozi, & Warshaw, 1989, p. 985). Perceived usefulness refers to an individual's belief that using the computer would improve their job performance, while ease of use refers to the amount of effort they perceive they will need to contribute in order to use the computer effectively. Furthermore, TAM specifies that users are primarily driven to use a technology because of the functionality it provides for them and, secondarily, for how easy it is for them to perform those functions (Davis, 1989). In other words, individuals will use a technology because it will improve their performance even if they may have to put in some effort to learn how to use it. Therefore, perceived usefulness drives technology adoption and is a factor that programmers and designers should consider when developing new technologies (Davis, 1989). Figure 1 illustrates TAM and shows the relationship between perceived usefulness and ease of use on technology use.

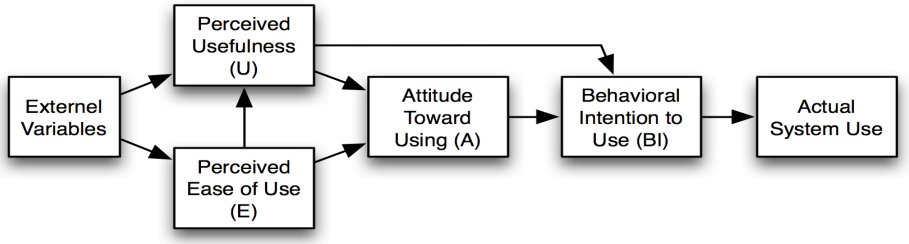

Figure 1. Technology Acceptance Model (TAM). Adapted from Davis et al. (1989)

Figure 1 shows that perceived usefulness and ease of use along with any other external variables, such as motivation or training, affect an individual's attitude toward using a particular technology. When an individual has a positive attitude towards a technology, either because it is perceived to be easy to use or enhances job performance, he or she is more likely to use it. Hence, the relationship between an individual's attitude towards using a technology (A) and his or her behavioral intention to use it (B) implies that "people form intentions to perform behaviors towards which they have a positive affect" (Davis et al., 1989, p. 986). In addition, an individual's behavioral intention to use a technology (B) can be directly influenced by its perceived usefulness (U) or how it will improve one's performance, the U-BI relationship. This is based on individuals forming intentions to use a technology because they feel it will improve their performance, regardless of whether they have positive or negative attitude towards it (Davis et al., 1989). Furthermore, perceived usefulness more significantly affects attitude and intended behavior than ease of use. According to Davis (1989) "although difficulty of use can discourage adoption of an otherwise useful system, no amount of ease of use can compensate for a system that does not perform a useful function" (p. 333). Although improving a technology's ease of use cannot

enhance its performance when useful functionality is not present, improvements in ease of use may contribute to an individual more effectively using the technology. As Davis et al. (1989) posit, "effort saved due to improved ease of use may be redeployed, enabling a person to accomplish more work for the same effort" (p. 987). Therefore, as illustrated on Figure 1, there is an arrow directed from perceived ease of use to perceived usefulness, illustrating that the perceived use of a technology could influence its perceived usefulness. Finally, Figure 1 shows that when an individual has a behavioral intention to use a technology, actual use of the system or technology, occurs.

Studies have shown that TAM has been established as a robust and powerful technology acceptance model as it helps predict user acceptance (Gao, 2005; Park, Lee, & Cheong, 2008; Venkatesh & Davis, 2000). Relating this model to the education sector and to this study could help to suggest when instructors would adopt or reject a new educational technology. According to Park et al. (2008), TAM is a useful model for explaining the factors that affect individuals' use of an electronic courseware system, such as WebCT Vista, in higher education. Following the tenets of TAM, if instructors believe that a technology will improve their teaching or their students' learning and that it doesn't require a lot of effort to use, they will likely adopt it. However, previous studies have not investigated the usefulness of TAM to predict or explain technology adoption amongst foreign language instructors in particular.

This study addressed this gap in the literature by investigating the factors that influence foreign language instructors to adopt technology. Whether the

factors discovered are consistent with TAM or offer insight into other ways of explaining technology adoption, the results are discussed later in *Chapter Seven: Discussion.* While TAM specifies that perceived usefulness and ease of use influence technology adoption, it does not explain why members of a social group or community adopt technology at different times. The next section discusses an alternate model that helps explain why certain individuals adopt technology earlier than others.

Rogers' (1995) Diffusion of Innovation Model discusses processes that occur as a technology becomes gradually accepted and used by most people in any given community. Individuals who are often the first to adopt a particular technology, the innovators, are excited and intrigued about new technologies and spend time experimenting with it and demonstrating its potential to others (Bates, 2000; Rogers, 1995). They play an instrumental role in the future of the technology within their community, as others often pay attention to results of their experimentation. Figure 2 shows the portion of the population that would be considered the innovators as well as the other four rates of adoption, according to the Diffusion of Innovations Model.

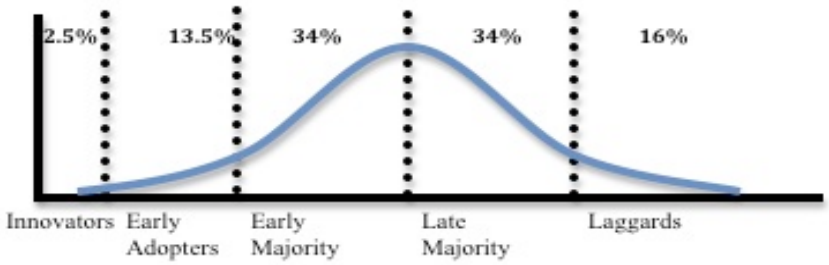

Figure 2. Diffusion of Innovations Model. Adapted from Rogers (1995).

As Figure 2 illustrates, innovators only represent about 3% of most instructors in an educational institution (Gillard, Bailey, & Nolan, 2008) and, hence, often form their own cliques or networks with other innovators in other institutions (Rogers, 1995). Bates (2000) refers to this small group of instructors as lone rangers since they often test the new technologies alone or with a graduate student, if funding allows. Once the innovators have demonstrated the effectiveness of an innovation, the early adopters begin to consider it. The early adopters are often the opinion leaders of a social system since they make well-informed technology adoption decisions (Rogers, 1995). This second group of instructors represents about 13% of instructors and combines their competence in selecting appropriate technologies and their interest in integrating technology in teaching and learning (Gillard et al., 2008; Rogers, 1995).

After the early adopters have decided to adopt a particular technology, the next group of instructors, the early majority, decides that it is time for them to begin using the technology as well. The early majority represents a large group of instructors, about one-third, who, although they do not lead in the technology adoption process, will adopt the technology, often after seeing the positive results from the early adopters (Rogers, 1995). The next group of instructors, late majority, follows the early majority in the technology adoption process, often after much social pressure from their peers. They represent about another third of the faculty and due to their skeptical attitude towards new technologies, often require convincing and support from those who have already adopted the technology (Gillard et. al., 2008; Rogers, 1995). Finally, the laggards are the last

in any social system to adopt a technology, sometimes choosing not to adopt at all. According to Rogers (1995), laggards are usually suspicious of new innovations and are quite traditional in their ways. Hence, they are not interested in changing their teaching approach and do not want to bother with learning how to use new technologies.

Although this study did not specifically explore instructors' rate of technology adoption, it was important to consider the Diffusion of Innovations Model when analyzing the study results as instructors may have shared that their technology adoption was due to whether they felt they were the first to adopt technologies or tended to wait until others had success with it first. Factors influencing technology adoption discovered in this study are reported later in *Chapter Six: Factors that Influence Technology Adoption*. The following section discusses a third model, the threshold network model, which explains how the size of individuals' social network relates to technology adoption.

2.12 Threshold Network Model

As discussed in the previous section, few instructors adopt technology very quickly. Some adopt it after it has been tested, the majority adopt it cautiously after it has been proven successful, and 16% either don't adopt it at all or are the last ones to adopt it. Rogers' Diffusion of Innovations Model illustrates that some individuals adopt a technology when it is first available while others wait for their peers and colleagues to test it before they consider it. The notion that some individuals are influenced in their decisions by the behaviors of their peers while others are not, leads to the network threshold model. This model

indicates that an "individual becomes influenced (i.e. adopts a new product) if a certain pre-specified number of its neighbors have adopted the product" (Chen, 2009, p. 1400). Individuals' neighbors are the peers or colleagues with whom they interact or discuss new products or technologies. Individuals who are influenced by their peers are considered to have a high network threshold while those who are less influenced are considered to have low network thresholds.

Low network threshold individuals engage in a particular behavior before many others do, while high threshold individuals do so after the majority around them has already engaged in the behavior (Valente, 1996). The innovators in Rogers' model adopt a particular technology without the motivation or influence of their peers. Hence, according to Valente (1996), these innovators have a low network threshold while the late majority adopters have high network thresholds, as they require being exposed to a large proportion of adopters before deciding to use the technology. This study explored the factors that influence technology adoption amongst foreign language instructors and whether their conversations or professional relationships with their peers affected their decisions to use a particular technology. Hence, the following section introduces the concept of social networks and their influence on teaching practice.

2.13 Social Networks

Individuals who are connected to one another either through professional or personal ties can be said to be part of the same social network. Every person has their own social network comprising of all the people with whom they interact such as colleagues, managers, friends, neighbors, and family. "Individuals are, as

it were, tied to one another by invisible bonds which are knitted together into a criss-cross mesh of connections" (Scott, 1988, p. 109). This type of social network is considered to be an egocentric network, which is focused on the number and type of relationships an individual has with others (Haythornthwaite, 1996). While egocentric networks refer to individuals' own networks of relationships, organizations also have their own social network consisting of all the ties and connections between the various members of the organization. These organizational networks are called whole networks as they "describe the ties that all members of an environment maintain with all others in that environment (Haythornthwaite, 1996, p. 329). Analyzing and comparing organizational networks helps determine the behavioral patterns and types of ties and relationships prevalent amongst different groups of instructors in an academic department. Instructors often communicate with colleagues regarding various aspects of their teaching, including whether to adopt a particular technology or not. The conversations that instructors have within their social networks can influence their understanding of teaching and learning (Roxa & Martensson, 2009) and, hence, affect their decisions concerning technology adoption. This study analyzed instructors' professional social networks by collecting information on as many instructors in an academic department as possible and their relations to one another, to form the overall web of relationships that exist within each department, which helped determine influential instructors or leaders (De Lima, 2008). While whole network analysis helps determine the types of connections amongst colleagues in an academic department, it requires responses from all

instructors. In this study, however, not all instructors chose to participate and hence, the partial social networks of the academic departments were analyzed instead. Therefore, *Chapter Four: The Use of WebCT Vista and Social Networks* reports on the partial social networks of each academic department in this study. *Chapter Three: Methods,* further describes the social network analysis process and the way that participants' responses were collected. The following section explores the literature on social networks and concepts such as trust and leadership and the characteristics of students' social networks.

2.14 Trust in Social Networks

In their study of social networks, Roxa and Martensson (2009) investigated the types of conversation university instructors had with others who were members of their social networks. Results showed that trust, privacy, and intellectual intrigue were required for meaningful conversations around teaching and learning to occur and social networks to be developed. Social connections are often made based on trust and honesty and lead to better and more meaningful learning and openness to engage in conversations about changes in teaching approaches (Niesz, 2007). Colleagues often choose to converse with those with whom they have a long history and who share similar interests and values (Roxa & Martensson, 2009). Privacy is crucial for instructors to have honest conversations with one another without worrying about those outside of their social networks possibly overhearing or judging them. Goffman (as cited in Roxa & Martensson, 2009) calls the private conversations that instructors have outside of the classroom and board meetings as *backstage* behavior, which is less

restricted than *frontstage* behavior where instructors are more careful about what they say and, therefore, do not openly converse with one another. As Niesz (2007) indicates, "teachers choose networks that engage them and are responsive to their passions and questions" (p. 608). Therefore, instructors choose to have conversations with members of their social networks who will help them "deal with problems and plan and evaluate actions" (Roxa & Martensson, p. 556). Not only are meaningful conversations between colleagues and the development of their social networks important, but how leaders emerge within a social network and their influence on others is also worthy of investigation. The issue of leadership will be discussed in the next section.

2.15 Leadership in Social Networks

The instructors who are the first in a community to adopt a new technology are often the leaders in the technology adoption process. As leaders, they often play a significant role in instructors' social networks and take on a distributed leadership role within their academic department. Distributed leadership is about the interactions between leaders, followers, and the situation and often allows for shared leadership between two or more individuals (Spillane, 2005). Having multiple leaders not only helps generate better ideas but it also allows those who have expertise in a particular area to make knowledgeable decisions for themselves and for their academic department. Furthermore, Harris and Spillane (2008) claim that, "a distributive perspective on leadership acknowledges the work of all individuals who contribute to leadership practice, whether or not they are formally designated or defined as leaders" (p. 31). In a

distributive leadership model, there may be instructors within an academic department that have certain formal leadership responsibilities in addition to instruction. For example, they may be appointed as the technology leader in their academic department. On the other hand, leaders may emerge from within social networks based on the amount of motivation and inspiration they may give to colleagues without any designated or formal leadership title. Finally, there may be designated leaders who, despite their titles, are not considered to be influential in their social networks.

Investigating social networks in an academic department can help determine who the influential non-designated leaders are and whether the instructors consider the designated leaders to have effective leadership within their social networks. Leadership within social networks can be measured by actor centrality, department network centrality, and department network density (De Lima, 2008). According to De Lima (2008), an actor, such as an instructor, who has the most professional connections with colleagues within a social network is considered to be the most central. Each member of an academic department can then be ranked based on how central they are in their social networks. Instructors who are most central tend to have leadership qualities, as they are the individuals that others in their network go to for advice or ideas. Network centralization measures how much a social network is focused around one particular instructor (De Lima, 2008). If there is high network centralization, most instructors within a social network only communicate with one or two particular colleagues who would often be considered the leaders rather than communicating with all the

instructors within a network. Department network density measures the proportion of connections between instructors in a network relative to the total number of connections that are theoretically possible given the number of instructors in the network. A low density network indicates that there is a low number of connections between instructors, and therefore, a lack of collaboration within the network and less distributed leadership (De Lima, 2008). Determining the leadership within a social network gives awareness to how colleagues can influence one another. The following section turns to the characteristics of students' social networks and their influence on technology adoption.

2.16 Social Networks of Students

Social networks, as discussed above, influence instructors' behaviors and decision-making as instructors communicate and collaborate with colleagues and follow the lead of inspirational leaders emerging from the connections within the networks. However, social networks can influence the behaviors of students as well. Tan (2009) explores the factors that influence students' adoption of an online learning environment. Results of her study show that although students thought that the online environment allowed student interaction, it also had a social stigma since the 'un-cool' students dominantly used it. Students relied on their social networks and the leaders within their social networks to help them decide if they should adopt the particular technology or not. The leaders within the social networks of the 'cool' students did not adopt the technology and, consequently, did not motivate the rest of the students to adopt it either. The social networks of the 'uncool' students, on the other hand, helped influence them

to start using the online environment once it was tested and determined effective by the innovators and early adopters. Thus, the study shows that the influence of peers within one's social network can determine whether a technology is adopted or not within a group of people. Following Tan's (2009) research, this study investigated whether foreign language instructors' conversations with colleagues and their social networks, affects their technology adoption or if there are other factors that may have more influence over instructors' decisions. Results are provided in later chapters and summarized and discussed in *Chapter Seven: Discussion.*

2.17 Summary

Numerous studies have been conducted on computer assisted language learning and the positive effect of educational technologies in the language classroom. Furthermore, technology adoption has been studied for many years and both the rate of adoption and the factors that influence it, such as collaboration, have been determined (Foulger & Williams, 2007; Kessler & Plakans, 2008; Rogers, 1995). Collaboration amongst colleagues and the relationships they have with one another helps develop individual and collective social networks. Since literature on technology adoption indicates that collaboration influences instructors to adopt the use of technology in their teaching (Davis, 2005; Kessler & Plakans, 2008), social networks could be influential in technology adoption decisions. Previous reports on social networks have discussed the types of conversation between members of a social network and the way leaders can emerge from them (De Lima, 2008). These studies

indicate that social networks can play a vital role in shaping teaching and learning. While previous literature has shown how social networks can affect adoption decisions made by students (Tan, 2009), few studies have touched on how such networks might affect the technology adoption decisions of instructors. This was, therefore, one of the major aims of this study. Due to the vast amount of previous literature indicating the positive effect of technology in language teaching, this study investigated how actively foreign language instructors in one post-secondary institution used educational technologies, namely the features and tools incorporated within the LMS, and the factors that influenced their technology adoption decisions. In particular, the social networks of the instructors' academic departments were analyzed to determine the characteristics and structures of these networks and whether they explained technology adoption or rejection. The methodology and type of analysis used in this study, together with details of participants and the research setting are discussed in the following chapter.

Chapter Three: Methods

This chapter begins with an overview of the research purpose and question followed by a discussion of the research setting including a description of the sampling method and the particular technology central to the study, a learning management system. The mixed-method methodology is introduced and a rationale for its selection is provided. The chapter continues with a justification for the underlying theory, social network theory, and a description of the data collection and analysis techniques and concludes with a discussion surrounding ethical issues.

3.1 Research Purpose and Questions

The purpose of this study was to investigate the factors that influence foreign language instructors' technology adoption decisions. *Chapter Two: Literature Review* discussed technology use in the foreign language classroom, technology adoption processes, and the role social networks play in instructors' teaching approaches and students' technology adoption. However, the review also indicated that further research is required to identify the factors that influence foreign language instructors to adopt technology. Hence, the design of this study addressed the factors that affect instructors' decisions to adopt the use of technology in their teaching, including whether instructors' social networks play a role in influencing their thoughts or actions regarding their decisions. The following four research questions were investigated:

i) How actively is the learning management system, WebCT Vista, used by foreign language instructors to facilitate their intended student learning outcomes?

ii) In what ways does communication with colleagues about educational technology, or their professional social networks, affect foreign language instructors' technology adoption decisions?

iii) According to foreign language instructors, what are the factors that influence their adoption of a learning management system, such as WebCT Vista, or other educational technologies?

iv) To what extent and in what ways can the factors emerging in questions two and three be used to predict an instructor's decision whether to accept or reject a new technology?

The first two research questions were explored using a combination of observational data collection, pre-interview questionnaires, and interviews with foreign language instructors. Results were analyzed through content and social network analysis. Content analysis is the systematic and rule-governed process of analyzing large quantities of written data by coding and categorizing concepts derived from the data (Cohen et al., 2007). Social network analysis refers to the "quantitative mapping of networks, and aims to measure their formal properties, notably the strength, intensity, frequency and direction of network relations (Heath, Fuller, & Johnston, 2009, p. 645). The types of professional relationships instructors have with their colleagues in their academic departments were

identified on the pre-interview questionnaires and analyzed through social network analysis. Content and social network analysis results are reported in the next chapter.

The following section provides an overview of the research setting including a description of the study site, participants, and the learning management system, WebCT Vista.

3.2 Research Setting

This study took place in a post-secondary institution in western North America with instructors from various foreign language departments. This educational institution has approximately 45,000 students in 14 different faculties annually. The Faculty of Arts is one of the largest faculties with approximately 750 faculty members teaching in 20 academic departments and schools and more than 20 interdisciplinary programs across the faculty. The humanities and social science courses fall within the Faculty of Arts at this institution. This specific educational institution was selected due to its history of foreign language instruction and current trend of active technology use amongst many of the language instructors, in order to understand the factors that influence the instructors to adopt technologies. Technology adoption was an important issue for the administration since there was a campus-wide learning management system, WebCT Vista, available for all instructors to use. Furthermore, a new mandate from the faculty administration of the foreign language instructors had recently indicated that beginning in the 2011-2012 academic year, all courses in the humanities and social sciences must have a WebCT Vista component available to

students with basic functionality such as an asynchronous discussion forum for questions and answers. These WebCT Vista course shells were made available for all courses, whether or not the instructor chose to engage with it. The population and sampling technique are discussed in the following section.

3.3 Population and Sampling

This case study was specifically interested in exploring the factors that influence foreign language instructors to adopt a particular technology at one particular institution. There were three foreign language departments and all permanent and sessional language instructors in the three departments were invited to participate in the study by personal e-mail. This form of sampling is called purposive sampling because the invited participants possessed the required characteristics for the purpose of this study (Cohen et al., 2007). According to Quatman and Chelladurai (2008), "although random sampling is critical to most conventional studies, it is often not of interest or particular use in many network studies" (p. 348). Since the second question in this study referred to social networks, it was important that the study involved the necessary participants for valid social network analysis to occur. In order to examine the links and relationships between members of a bounded population, such as all the employees in a particular department, it is important to have as complete a network as possible (Heath et al., 2009). Consequently, it was important to involve as many instructors as possible in each of the three foreign language departments in order for the departmental social networks to be as complete as possible. Random sampling, therefore, would not have been effective for this

study and purposive sampling was more appropriate. Furthermore, access to instructors in the foreign language departments was not very difficult as their contact information was publicly accessible. Thus, snowball sampling, which helps increase a study's sample size by requiring every participant to provide the names of colleagues who later can be invited to join the study (Goodman, 1961), was not necessary. In addition, another form of sampling, quota sampling, strives to represent the characteristics of the greater population as accurately as possible (Cohen et al., 2007). This sampling method is ideal for certain studies that require data from individuals with specific characteristics. However, it was not appropriate for this case study, since this study did not require having participants with specific factors such as age, gender, or ethnic background.

The following table provides an approximate number of the language instructors in each department at the time that the study occurred. Every language instructor in the three departments was invited to participate in the study.

Table 1

Number of Foreign Language Instructors

Department Name	# of Language Instructors
Department A	15
Department B	28
Department C	30

Note: literature and classical language instructors were excluded from this study

The table above indicates the approximate number of foreign language instructors who taught in each of the three foreign language departments in the research setting during the 2011-2012 academic year. In order to investigate

patterns emerging from the adopters and non-adopters, all instructors were invited to participate in this study regardless of whether they used the particular technology, WebCT Vista, or not. The learning management system (LMS), WebCT Vista, is described in the next section.

3.4 The Learning Management System (WebCT Vista)

The post-secondary institution, which was the context of this study, provided an online learning management system (LMS) to all faculty members. The LMS available at the time this study was conducted was WebCT Vista, a commercial product hosted locally at the institution. According to data available from the 2009-2010 academic year, approximately 14% of the face-to-face courses offered by the Faculty of Arts at this educational institution had an active corresponding WebCT Vista online component (Macfadyen, 2010). WebCT Vista provided a number of features that instructors could choose to use to enhance their teaching. The most commonly used features in the Faculty of Arts were the capacity to post files, such as lecture notes and audio files to the learning management system and to record and post students' grades. However, a number of interesting features were also available such as asynchronous audio voice boards, asynchronous discussion forums, online assignments and assessments, and wikis. As mentioned earlier, the first question of this study explored how actively the foreign language instructors at this post-secondary institution use WebCT Vista. The study investigated which features and tools were most commonly used in this particular discipline. The following section discusses the selected methodology for this particular study.

3.5 Chosen Methodology and Rationale

This study used a mixed-methodological approach, since a combination of observational data collection, pre-interview questionnaires, and interviews with instructors were necessary to identify and explore in-depth the various factors that influence instructors to adopt or reject a particular educational technology. Observational data collection showed how actively the participants used WebCT Vista, pre-interview questionnaires provided a way for participants to indicate with which participants they discuss technology, and interviews allowed an opportunity to learn about the other technologies that participants used and to explore in depth the factors that influence their technology adoption decisions. The data in this study was analyzed with a mixed-approach as well. A combination of qualitative thematic content analysis and descriptive social network analysis helped determine the patterns that emerged from the data collection. The following section discusses the case study approach and provides a rationale for its appropriateness for this study over experimental and historical research. A discussion of potential underlying theoretical approaches follows with justification for selecting social network theory as the theoretical basis for this study.

3.6 Case Study versus Experimental and Historical Research

In order to investigate the research questions outlined at the beginning of this chapter, a case study was chosen as the most appropriate research method because this study explored the factors that influence the behavior of a specific group of individuals within a very specific uncontrolled context. According to Yin

(2009), a case study approach is appropriate when the investigator does not have control over the behavior of the research participants and the focus of the study is on contemporary rather than historical events. Furthermore, a case study focuses on the events or phenomena occurring in a single setting (Eisenhardt, 1989). The intent of this study was to examine how actively foreign language instructors in one particular post-secondary institution use educational technology and to determine the most common factors that influence their technology-adoption decisions. Unlike experimental studies where "investigators deliberately control and manipulate the conditions which determine the events" (Cohen et al., 2007, p. 272), this study explored the behaviors of the study participants, the foreign language instructors, in their authentic contexts without controlling the research environment or participants' behavior. Experimental studies involve providing a specific treatment to one group of participants and comparing the results to a control group that did not have the treatment (Creswell, 2009). Since this study did not involve determining the effect of a treatment and there was no need to control the behaviors of the participants, an experimental study would not have been appropriate. Furthermore, this study specifically explored the current use of educational technology in foreign language teaching. In contrast, a historical study examines and interprets data from historical sources (Danto, 2008) such as original documents and oral histories and secondary sources written by those who were not present during the events but who provide their own historical account of the past (McDowell, 2002). Fortunately, for this study, data could be collected through direct observation of WebCT Vista environments and interviews with

current language instructors. Consequently, the study did not have to rely on historical evidence. Therefore, a case study approach was more appropriate than a historical one. In addition, this study explored the effects of communication and collaboration amongst instructors, which, as described in Chapter Two, are the basis for social network theory. The following section outlines what is meant by the terms constructivism, social constructivism, and connectivism and explains the rationale for selecting social network theory as the framework for this study.

3.7 Theoretical Framework

In the social sciences, the purpose of theory is to describe, explain, and predict a particular behavior (Glaser & Strauss, 1999). A theory may appear in a research study as an argument or a rationale that tries to explain and predict a phenomenon that occurs (Creswell, 2009). Some research studies are designed to test and verify an existing theory that has been proven or has been developed from a different study. In these studies, the theory is part of the study's hypothesis and analyzed data will either confirm or disprove it. There are three relevant learning theories that could frame the basis of this particular study. As mentioned in Chapter Two, constructivism assumes that "knowledge is constructed by learners as they attempt to make sense of their experiences" (Driscoll, 2002, p. 376). Learners are not obtaining knowledge from an expert but, instead, are developing their own knowledge through experience. Social constructivism assumes that knowledge is developed through interactions with others (Vygotsky, 1978). If either constructivism or social constructivism were the underlining theory for this study, the focus would have been to explore how foreign language instructors

learn about educational technology and construct their own understanding of its purpose in teaching. Another possible theoretical starting point for this dissertation could have been connectivism, which argues that learning is based on connecting information sources together in order for individuals to continually have access to current information and knowledge (Siemens, 2004). If this study were rooted in connectivism, it would explore how instructors gather information from various places in order to make informed decisions about educational technology. However, the intent of this study was to investigate the factors that influence instructors to adopt technology, and in particular, the effect of the collaborations or connections they have with their colleagues. A study that investigates the relationships between different members of an organization and the way that information flows between them is better situated in the theoretical paradigm of social network theory (Haythornthwaite, 1996).

While this study investigated the factors that influence technology adoption amongst foreign language instructors, an underlying theoretical framework was used to explore the events and phenomena. This theoretical framework was social network theory, which suggests "we come to know and understand the social world by taking the relational components of phenomena into consideration" (Quatman & Chelladurai, 2008, p. 341). Social networks reveal the type of interactions and relationships that occur between two or more people and the information that is exchanged between them (Haythornthwaite, 1996). This exchange of information can lead to behavioral changes or the adoption of different practices. Case studies based on social network theory focus

on the effects of the interactions between study participants (Martinez, Dimitriadis, Rubia, Gomez, & de la Fuente, 2003) and, in educational contexts, such interactions amongst instructors help foster the sharing of successful teaching practices and provide opportunities for knowledge creation and innovation (Hargreaves, 2001). For example, instructors who use educational technology may share their teaching methods with others and potentially influence the more traditional instructors to experiment with technology. "Meeting with colleagues who are technologically advanced enables teachers to see the potential of technologies that they were unfamiliar with or never had considered using" (Oncu et al., 2008, p. 32). Since the second question in this study explored whether communication amongst foreign language instructors affects their technology adoption, adopting social network theory for this study was appropriate. The literature review in Chapter Two discussed social networks and how they can influence the behaviors of individuals. However, since there have not been previous studies specifically investigating the role that professional social networks may have on the technology adoption of instructors, this study, rooted in social network theory, investigated whether the professional social networks of foreign language instructors influences their technology adoption or if other factors may be more significant. The following section discusses qualitative and quantitative research methods and will provide justification for qualitative data collection and analysis.

3.8 Quantitative and Qualitative Methods

A case study can combine qualitative and quantitative methods or can be focused on a single method (Cohen et al., 2007; Yin, 2009). Qualitative research allows for a deep investigation in order to understand the reasoning behind individuals' behavior and to determine if patterns emerge from the data collected that can be generalized to a wider population (Creswell, 2009). Qualitative researchers generally have a close interaction with the study participants, as data collection usually involves interviews or focus groups (Cohen et al., 2007). According to Creswell (2009), "quantitative research is a means for testing objective theories by examining the relationship amongst variables" (p. 4), typically through surveys and experimental research designs (Gay & Airasian, 2003). Mixed-methods allow for qualitative data to show the rationale underlying the relationships revealed in the quantitative data (Eisenhardt, 1989). In order to answer the research questions in this study, data was collected through qualitative methods and analyzed through qualitative content and descriptive data analysis. The next section discusses the methods of data collection used in this study.

3.9 Observations, Pre-interview Questionnaires, and Interviews

Qualitative data collection methods were used to seek answers to the research questions. Examining each research question individually helped determine the appropriate data collection technique to yield sufficient data for analysis. The first research question asked how actively foreign language instructors in the case study educational institution use the learning management system, WebCT Vista. Specifically, this question explored which tools, namely

online assessments and asynchronous discussion forums among others, the study participants used in their teaching. Observing instructors' WebCT Vista environments began to answer this question. As indicated earlier in the chapter, at the time of this study, only some of the foreign language instructors used WebCT Vista as a supplemental learning environment for their students. Some had not adopted this technology at all and those who had adopted it used it in different ways. Observational data collection through examining WebCT Vista courses therefore provided some objective data to determine how the participants were using the learning management system. Once consent had been received from the language instructors who volunteered to participate in the study (see Appendix C), their current and previous WebCT Vista environments were observed to determine which tools within WebCT Vista they had used since their adoption of the technology. The observation provided an overview of all the tools that each instructor had chosen to use and also showed if they rejected certain tools after trialing them. All observational data was stored on a password-protected computer and password-protected file. Each participant's name was replaced with a random, non-identifying code to ensure anonymity. Course and section numbers were not recorded in the data to ensure greater anonymity. Student consent was not required as student data, such as responses on discussion boards, were not collected or analyzed.

To explore the study question more deeply and to get a better understanding of which tools within WebCT Vista the instructors used and how they made their selection, interviews with study participants were required.

According to Cohen et al. (2007), interviews allow participants to express their personal views on a situation, enriching the data collected. Hence, during their interviews, the participants could elaborate on how they use the WebCT Vista environment or could explain why they chose not to use it. Prior to the interviews, the participants were asked to complete a pre-interview questionnaire with questions regarding their technology adoption. The answers supplied on the questionnaire helped guide the interview questions as they provided some additional background information concerning the types of technologies each participant used. Such information helped prompt further questions for clarification and elaboration during the interview enhancing the richness of the qualitative data collected. This leads to the second question of this study:

ii) In what ways does communication with colleagues about educational technology, or their professional social networks, affect foreign language instructors' technology adoption decisions?

In order to determine whether conversations among instructors influence technology adoption decisions, their professional social networks had to be analyzed for any emerging patterns. To discover their social networks, the last question on the pre-interview questionnaire asking them to identify the colleagues in their academic departments that they spoke to about educational technology. In order to make it easier for participants to recall which colleagues they communicate with, a roster of names of all language instructors in their department was provided on the pre-interview questionnaire. According to Stork and Richards (1992), "providing a roster of names lessens the likelihood that

respondents will overlook certain of their relationships" (p. 205). While the pre-interview questionnaire allowed the participants to identify their professional social networks in their departments, interviews were required to further investigate whether they have technology-related conversations with colleagues outside of their departments, how often such discussions took place, and whether they found conversations with their colleagues to influence their technology adoption decisions. Interviews were conducted in person, since according to Cohen et al. (2007), telephone interviews tend to be briefer, not allowing participants the opportunity to deeply reflect before responding. In addition, participants may experience distractions depending a where the participant may be located (Cohen et al., 2007). For these reasons and also for the convenience of the participants, interviews were held in the same building where the participants taught their classes or in their offices in order minimize any additional travel required by the participants. While the interview provided information about the participants' social networks and how they perceived technology-related conversations to affect their decisions, interviews also helped explore other factors that the participants felt influenced their technology adoption decisions, which addressed the third question in this study:

iii) According to foreign language instructors, what are the factors that influence the adoption of a learning management system such as WebCT Vista?

The literature review in Chapter Two indicated that previous studies on technology adoption have shown that factors such as time, training and support,

general interest, and ease of use influence technology adoption. By asking the participating instructors which factors they thought influenced their adoption decisions, the study began to determine if there were any similarities amongst the data collected and whether this study supported the results of any previous research. Interviews were audio recorded for transcription purposes, with permission from the interview participants. Transcriptions were sent to the participants for review to ensure accuracy. The names of participants were not recorded on the transcription and, instead, random identification tags were used to ensure anonymity as much as possible. The same identification numbers as those used to identify their WebCT Vista course for observational data collection were used, to allow interview and observational data to be compared. The names of their colleagues were also not recorded in the transcription, and instead, an identification tag was used to further protect the participants' privacy. All transcripts were stored in password-protected files within a password-protected computer and will be destroyed after five years, following the requirements of the Ethics Board of the educational institution where this study took place. While interviews provided the data required, information about the factors that influence instructors' technology adoption and their professional social networks could have been obtained by questionnaires only. The following section discusses the use of questionnaires for data collection and how this technique differs from interviews.

3.10 Questionnaires versus Interviews

This study used a combination of pre-interview questionnaires and face-to-face interviews with participants to discover in-depth information. However, some

studies use questionnaires as the only data collection instrument, because it allows responses to be given anonymously. Anonymous questionnaires tend to be more reliable as participants can be more honest and, since they are self-administered, participants can complete them whenever they wish, thereby reducing the participation time required for a study (Cohen et al., 2007) compared to other forms of data collections such as in-person interviews. Unlike questionnaires, interviews cannot be anonymous and, hence, the participants may not be truthful in their responses (Guy & Airasian, 2003). As discussed earlier, this study used purposeful sampling and foreign language instructors were specifically contacted and invited to participate in the study and take part in an in-person interview. Hence, the study participants were not anonymous to the interviewer. However, as mentioned previously, on the interview transcripts, all names were replaced with identifier tags to ensure anonymity in the data presented in any reports or published documents.

Interviews generally can take more of the participants' time than questionnaires. Since interviews allow for greater questioning and explanation (Cohen et al., 2003), they can take more time than completing a questionnaire and a mutually convenient time for the interviewer and the interviewee would need to be determined. Despite the greater amount of time required for interviews and the complexity of determining a convenient time for the participants, this study used interviews rather than relying only on questionnaires so that more in-depth information about the participants' social networks and the factors that influence their technology adoption could be discovered. Furthermore, interview response

rates are typically higher than those for questionnaires since participants become more involved and, hence, motivated to participate (Oppenheim as cited in Cohen et al., 2007). Since the participant sample in this study was small, as discussed earlier in the chapter, it was important to obtain the highest response rate possible. Accordingly, interviews were most appropriate. Furthermore, the use of semi-structured interviews rather than open-ended or completely structured interviews was ideal for this study. In semi-structured interviews, topic-initiating questions based on the research questions completed by follow-up questions elicited a detailed explanation from the participants (Rapley, 2001). Open-ended interviews, on the other hand, would have had all questions spontaneously prompted by the flow of conversation rather than having some questions derived from the research questions (Guy & Airasian, 2003) and fully structured interviews would not have provided the flexibility of probing further into an issue that may emerge from the participants' responses (Cohen et al., 2007). Appendix A provides a list of the interview questions that were used in this study in order to collect the data required for the first three research questions.

The final research question explored the patterns that emerged from the previous questions. In particular, this question explored the common factors discovered and how they related to results reported in previous studies. *Chapter Seven: Discussion* provides an overview of the results and discusses how the most common factors are related to previous literature. The following section introduces the data analysis methods employed in this study.

3.11 Data Analysis Methods

After data collection, content and social network analysis investigated any patterns emerging from the data. Content analysis of the observational and interview data allowed for recurring themes and concepts to be identified. For example, it helped discover common factors that instructors indicated in their interviews as influencing their technology adoption decisions. Since the structure of instructors' academic departmental social networks, or how information flows across the network could influence instructors' technology adoption decisions, social network analysis was necessary to discover any emerging patterns. This helped determine if there were any particular technology leaders that helped spread information across the departmental social network and, therefore, played a role in influencing their colleagues' technology adoption decisions. The following section discusses content analysis and how it was used in this study.

3.12 Content Analysis

The textual observation data and the transcripts of the interviews mentioned in the previous section resulted in copious amounts of data. Through content analysis, textual data was coded, categorized and placed in manageable and comprehensible groups ready for further analysis (Cohen et al., 2007). Qualitative content analysis software, Atlas.ti, was used to facilitate the coding and categorizing of transcript content. Atlas.ti is commonly-used qualitative research analysis software that is designed to organize a great amount of data, such as the data generated from the interviews in this study. As mentioned previously, participants were asked to review the transcripts of their audio-

recorded interviews to ensure the content was accurate. This type of review is called member-checking and participants were given the option to receive hard copies, electronic copies, or audio copies of their transcripts for review (Carlson, 2010). False starts and some grammatical errors were omitted in order for the narratives to have a better flow (Carlson, 2010). Instructions for member checking were provided so that participants were aware that they did not need to fix grammatical errors but could provide additional information that they may have forgotten to include in the interview or could remove any information they did not want included in the analysis. After all transcripts had been checked and approved by the participants, their names were replaced with random identifier tags and the data was ready for analysis and for coding into specific categories. As Cohen et al. have commented, "(t)o be faithful to the data, the codes themselves derived from the data responsively rather than being created pre-ordinately (Cohen et al., 2007, p. 478). Hence, the concepts that arose from within the interview and observation data were coded and similar codes were clustered into categories or code families. Once the coding and categorizing was complete, the frequency of each code used in all the transcripts was counted in order to determine if patterns arose amongst participants' responses (Cohen et al., 2007). Content analysis helped determine the way that the foreign language instructors used WebCT Vista and the factors that they felt influenced their technology adoption decisions. The results of the content analysis are reported across the three results chapters that follow this chapter. However, in addition to content analysis, social network

analysis was required to determine the influence of social networks on instructors' technology adoption decisions. This is the topic of the next section.

3.13 Social Network Analysis

According to Martinez et al. (2003), "social network analysis seeks to describe patterns of relationships among actors, to analyze the structure of these patterns and to discover what their effects are on people and organizations" (p. 354). One of the questions of this study addressed whether the social networks of foreign language instructors play a role in influencing technology-related decisions. In addition to determining whether relationships between instructors exist or not, the centrality of certain individuals (or actors) in the department or social network was analyzed. As discussed in Chapter Two, centrality concerns the number of connections or links an individual has with others in the network or, in other words, the popularity of the individual (Scott, 2007) amongst others in the network. Betweenness centrality, referring to the extent in which a participant in a network is in an intermediary role connecting other members of a network together (Burt, 1992), was explored to determine any relationship between instructors' technology adoption and their position in the network. Such analysis helped determine which instructors helped spread information about technology across the departmental network and, therefore, potentially influenced the technology adoption decisions of their peers. Figure 3, a sociogram, illustrates a social network comprised of eight individuals represented by nodes. The lines between the nodes indicate a relationship or connection between the nodes while

the size and colour of the nodes illustrate the betweenness centrality of each node with larger nodes representing greater betweenness.

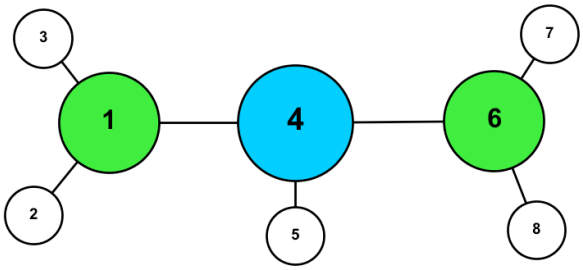

Figure 3. Sociogram illustrating betweenness centrality

The large blue node in the centre of Figure 3 has the highest betweenness centrality since this node connects the nodes on the left and right side of the network together. In other words, information discussed between individuals on one side of a network can flow to those on the other side through the person represented by the blue node. As an intermediary, the blue node helps information to flow to others in the network who may otherwise not have access to the information. Within the network, there are also egocentric networks focusing on the interactions of one individual. Egocentric networks focus on the types or numbers of relationships or interactions an individual has with others, while organizational networks consist of all the connections between the various members of an organization (Haythornthwaite, 1996). For example, the egocentric network for Node 1, at the far left of Figure 3, consists of three individuals. Analyzing and comparing instructors' professional egocentric networks as well as departmental organizational networks can identify behavioral patterns prevalent amongst different groups of instructors.

Social network analysis software, Gephi, was used to develop the sociograms of each academic department and to determine the betweenness centrality of instructors based on the information provided by the participants. The sociograms helped visualize the position of each instructor in the networks and the interactions that took place between the colleagues. In order to use textual data from the pre-interview questionnaires, the names of the colleagues with whom the participants indicated that they discuss technology were added to a spreadsheet and imported into Gephi. To ensure anonymity, actual names of interview participants or the instructors that they listed as being a part of their social network were replaced with random identifying tags. The sociograms showed the ties between the participants and their colleagues and the location or centrality of each participant in relation to the other instructors in the departmental network. The sociograms are shown and discussed in detail in the following chapter, *Chapter Four: The Use of WebCT Vista and Social Networks*. The next section discusses the ethical issues pertaining to this study and specifically, how participants' anonymity was ensured.

3.14 Ethical Issues

This study sought the guidance and approval of the research ethics boards of both the institution where the researcher was enrolled and the institution of the participating instructors, prior to commencing with any data collection. Interview questions (Appendix A), the letter to prospective interviewees (Appendix B), the consent form that interviewees signed, showing their voluntary participation (Appendix C), and the pre-interview questionnaire (Appendix D) were included

with the ethics application forms for approval. Transcripts of the audio-recorded interviews and all electronic files will be stored for five years in password-protected files on the researcher's password-protected computer. If paper copies of any of the consent forms or pre-interview questionnaires were made, they were stored in a locked filing cabinet in the researcher's office. To ensure anonymity of all participants, their names were only recorded on the consent forms and were not used on any transcripts, data analysis documentation, or published materials. As mentioned previously, random identifier tags were used to refer to each participant in the data. Furthermore, for greater confidentiality and to maintain their privacy, their WebCT Vista course numbers were not recorded in any of the observational data collected or the transcripts, the names of all colleagues mentioned were replaced with identifier tags, and the names of their academic departments and the name of the educational institution were not stated in any transcripts or published reports.

3.15 Summary

This chapter began by reviewing the purpose of the study and the particular research questions. It continued with a description of the educational institution where the study took place and the population and study sample setting the context of the study. As mentioned earlier in the chapter, all foreign language instructors in the educational institution were invited to participate in this study, regardless of whether they used the learning management system, WebCT Vista. The chapter introduced the case study, explained its appropriateness for this study and provided an argument justifying the theoretical underpinning of the study

namely, social network theory. Since one of the purposes of this study was to determine the effects of instructors' social networks on their technology adoption decisions, the chapter discussed the appropriateness of situating the study in social network theory. The chapter continued by describing the data collection techniques that were used and explained the importance of qualitative data collection for determining the way that instructors use WebCT Vista and the factors that they consider influential for technology adoption. Following the data collection methods, the chapter discussed the data analysis techniques including social network analysis for the purpose of determining social patterns amongst instructors and the relationship, if any, between their technology adoption and their position in their departmental network. The chapter concluded with a discussion about the ethical issues pertaining to the study. The following three chapters report on the study findings and discuss how they begin to answer the study's first three questions.

Chapter Four: The Use of WebCT Vista and Social Networks

As indicated in the previous chapter, this mixed method study used a combination of observational, pre-interview, and interview data to address the research questions. Qualitative content analysis and social network analysis discovered patterns emerging from the data that helped determine the overall factors that influence the technology adoption of foreign language instructors and the effects, if any, of their technology-related discussions with their colleagues, namely their professional social networks. This chapter begins by discussing the sampling procedure and the participants in the study and revisits the first research question, focusing on how actively foreign language instructors use the learning management system, WebCT Vista. It will then turn to the second research question and through social network analysis, explores the relationships between colleagues in each department who discuss technology together.

4.1 Participant Sample

Chapter Three: Methods presented and discussed various possible sampling techniques and indicated that purposive sampling is the most appropriate technique for this particular study. Hence, all language instructors at one public post-secondary institution in western North America were invited to participate in this study. The foreign languages in this institution were taught within the Faculty of Arts and in three separate academic departments. The Chairs of each of the departments were sent an electronic notice notifying them of the study and requesting that they contact the researcher if they had any concerns with their instructors being invited to participate. None of the Chairs expressed concern

and one of them replied indicating support for the study and the instructors' involvement. Soon after, all language instructors from the three departments were sent an electronic information letter and consent form with instructions on how to respond, if they chose to participate in the study. Follow-up electronic letters were sent a few weeks later to those who had not responded, in case they had missed the first invitation. The following table shows the number of participants from each department.

Table 2

Participants

Department	# Invited	# of Participants	Response Rate
A	30	4	13%
B	16	7	44%
C	29	12	41%
All	75	23	31%

As illustrated in Table 2, at the time that invitations were sent, there were 30 language instructors in Department A, 16 instructors in Department B, and 29 instructors in Department C. Overall, the response rate consisted of 23 out of 75 instructors (31%) consenting to participate in the study. Response, however, was unequal across the departments. Only four instructors out of 30 in Department A, who were invited to participate, actually agreed to join the study. This is a considerably low proportion compared to the other two departments. Out of the 16 possible participants in Department B, seven participated. Department C had a

similar number of participants, with 12 out of 29 instructors participating. It was therefore necessary to consider this lower-than-anticipated response rate with respect to Department A when determining any conclusions or generalizations. In addition, some of the participants were also coordinators of the language programs in their departments. Their role as a language coordinator could potentially influence the number of people they talk to about technology or their position in their departmental network. The significance of their role, if any, will be discussed later in this chapter when the results are presented. Finally, while both instructors who currently use the learning management system, WebCT Vista, and those who chose not to use it were invited to participate, all participants except for one actively used the system in some capacity. Hence, the data, for the most part, only represents instructors who have adopted the technology.

4.2 Research Question #1: WebCT Vista Usage

The first question that this study addressed refers to which tools available in WebCT Vista were used the most by foreign language instructors in the study to meet their teaching objectives. Specifically, the study explored:

i) How actively is the learning management system, WebCT Vista, used by foreign language instructors to facilitate their intended student learning outcomes?

As mentioned in the previous chapter, WebCT Vista is a learning management system that was freely available for all instructors at the institution in this study to use, as a supplement to their face-to-face in-classroom instruction. Individual

instructors, or in some cases, the language coordinators, selected the tools that they used in each course. In order to investigate how actively WebCT Vista was used, observational data was collected from the participants' WebCT Vista online environments for all the courses they taught in 2010 and 2011 at this institution. The term 'actively' is used in this question to refer to the number of different types of tools each participant had deployed in 2010 and 2011 through WebCT Vista. The WebCT Vista tools used by the foreign language instructors were observed and noted, in order to determine which tools were used most commonly and which instructors had adopted WebCT Vista the most. Table 3 lists the total number of participating instructors who used each tool in at least one WebCT Vista course in 2010 and 2011.

Table 3

Observational Data of Total Vista Usage

Note. Disc = Discussion Board; Assign = Assignment Tool

Disc	Quiz	Assign	Wimba Board	Links	Note	MP3 Files	Grade Book	Icons	HTML Pages	News
11	12	5	1	17	22	9	6	11	3	4

As can be seen on Table 3, out of the 23 participants, 22 used WebCT Vista for posting lecture notes. This appears to have been the most popular tool to use, but it raises the question of why one of the participants decided not to use it. Using WebCT Vista to add links to external websites was the second most popular use of the system, followed by using the quiz tool for either graded

quizzes or for self-tests and choosing to replace the default standard icons with custom icons and using the asynchronous discussion board. Only four participants chose to use the news tool for current announcements and only a few chose to have their course content represented on HTML pages. Lastly, only one person used the Wimba Board, an asynchronous audio discussion board.

As mentioned earlier, the observational data also shows the number of tools within WebCT Vista that each participant had chosen to use. Table 4 indicates the total number of different WebCT Vista tools each participant had used over the past year. For anonymity, participants' names are replaced with non-identifying codes. Each code included a prefix "c" or "i" to differentiate between participants who were language program coordinators and those who were instructors in case there were any notable differences between the two groups of participants. As noted in *Chapter Three: Methods,* a portion of this study included whole or partial social network analysis of the participants' academic departments to determine if any patterns emerge. Therefore, to help recall the participants' departments, the suffix "A", "B", or "C" was added to the end of each code to specify to which department a participant belonged. Finally, each code includes a random numerical number, differentiating the participants in each department.

Table 4

Observational Data of Vista Usage per Participant

Department A		Department B		Department C	
ID	Vista Usage	ID	Vista Usage	ID	Vista Usage
c1A	6	c1B	3	i1C	7
i2A	7	i2B	4	i2C	2
i3A	3	c3B	3	i3C	1
i4A	0	i4B	3	i4C	6
		i5B	3	i5C	2
		i6B	6	c6C	4
		i13B	5	c7C	7
				i8C	5
				i9C	7
				i10C	6
				i11C	3
				i12C	8

In Table 4, the participants in each department are differentiated, to highlight which instructors used the most number of tools available in WebCT Vista in each department. This data will be useful later in the chapter when participants' social networks are discussed. The results in Table 4 show that two of the instructors in Department A (c1A and i2A) used a similar number of tools while a number of instructors in Department B (c1B, c3B, i4B, and i5B) used the

exact same number of tools as each other. Department C shows a greater variety of tool use in WebCT Vista amongst the participants. Through these observations, it was noted that some instructors had the exact same WebCT Vista course environment while others had created environments unique to their own use. In Department A, for example, two instructors (c1A and i2A) had very similar courses with respect to the design and the tools used. On the other hand, one instructor (i4A) had blank WebCT Vista environments showing that none of the tools were activated. In Department B, all the WebCT Vista courses were identical, except for those of three instructors (c1B, i6B, and i13B). The three instructors who had unique sites also used more tools within them. Unlike the other two departments, all the WebCT Vista environments for instructors in Department C were unique and used different tools. There was a wide range of WebCT Vista use in this department, from one instructor using eight different tools (i12C) to one instructor (i3C) only using one tool.

The observational data depicted in Table 3 and 4 is limited to showing the total number of the different types of which tools the participants had selected to use. It cannot explain why some of the instructors' online courses were identical or why some were unique. The differences may be due to the flexibility given by the curriculum or the language coordinators, in the selection of which tools to use. Interview data reported in the next section addresses the reason for these identical and unique courses. Furthermore, the observational data does not show whether the participants had chosen to include other educational technologies in their teaching. Perhaps the participants, who had not used WebCT Vista as much as

others, had chosen to use other technologies instead. The interview data discussed in the following section complements the observational data and addresses these issues.

4.2.1 Understanding Identical WebCT Vista Sections

While observing the participants' WebCT Vista courses, the researcher discovered that some of the online environments were identical, with the same appearance and using the same tools. During the interview, therefore, the researcher asked the participants to explain how multiple sections of the same language course incorporated WebCT Vista. The instructors in Department A indicated that, although a language coordinator designed the WebCT Vista environments of the first year courses (and sometimes second year as well), instructors could add to it with their own resources or use other tools if they wished. As the coordinator, c1A, commented: "each of the instructors has his or her own version of the course for which they have designer access so if they want to add things and build on it then they have to know the technology". This helps explain why two participants in Department A had very similar WebCT Vista environments, except that one made additional use of the Assignment tool for students' assignment submissions. Similarly, in Department B, the coordinator, c3B, built the WebCT Vista environments for the first and second year courses that the other instructors had to use. However, the instructors could supplement it with their own material if they wished, as represented in the excerpt below.

> **Interviewer**: Because you are one of the coordinators, when you set up the course, say a first year level course whichever it may be, are the tools

> within it required for all the instructors teaching that course to use or is it optional?
>
> **Coordinator:** No, it's not optional, it's required.
>
> **Interviewer**: Okay, so it's required that they use it. Can they add to it with their own material? Can they supplement it?
>
> **Coordinator:** They can, but not something like the tests.

The excerpt above, from the interview with one of the coordinators in Department B, helps explain why many of the participants in that particular department had identical WebCT Vista environments and used exactly the same tools. The courses in Department C, on the other hand, were all quite unique. The interview with one of the language coordinators in this department, c6C, explains that although a common WebCT Vista course was available for instructors to use, they were encouraged to build and develop their own online environments, using whichever tools they wished. The coordinator elaborated:

> I set up the common sites for them so everyone will be registered, the classes will be registered there but to make the instructor feel comfortable, they are not obliged to use it. I will give them options but then its there for them to use… And at the same time I encouraged them to set up their own personal site so they can experiment with it on their own because sometimes they might want to, you know, experiment with some teaching materials which they still don't feel comfortable sharing with everyone else so they can do their own.

Since the coordinator encouraged the individual instructors to set up their own WebCT Vista course sites, they were all quite different. Instructors could choose to customize the appearance with their own icons and could choose to use whichever tools they thought would be useful for their course, such as discussion forums or audio voice boards. The interviews with the coordinators, coupled with observational data reported in the previous section, show that the departments have different strategies towards the use of WebCT Vista. The language coordinators in departments A and B initially created the WebCT Vista environments for the instructors but encouraged them to supplement these with additional technology if they wished. In Department C, however, the coordinators gave instructors the option of using a central coordinated-created WebCT Vista site or to create their own sites using whichever technologies they felt were appropriate for their courses. This difference in strategies across departments is important to consider during the analysis of the social networks of the three departments later in this chapter. The following section explains the interview analysis procedures and how codes and code families were derived for addressing the study questions.

4.2.2 Interview Transcript Analysis Procedures

Interviews with all the participants were transcribed and returned to the participants for member-checking. Transcripts were then prepared for analysis by replacing all participants' names and those of their colleagues who they had mentioned in their interviews with non-identifying codes, as discussed in the previous section. Using qualitative analysis software, Atlas.ti, the transcripts were

read carefully and segments that were relevant to the study questions were coded using open-coding. In other words, pre-determined codes were not used. Instead, the codes emerged from the participants' responses and similar codes were clustered together into code families (CF). The software stored the various codes and code families and provided query and filter tools for searching for various codes and their corresponding segments across all the transcripts. This functionality helped compare the responses of the participants to each other. In addition, each code was used only once per transcript in order to determine the total number of transcripts that included a particular code. Since the codes represented the different responses given by the participants, using a code only once per transcript helped determine how many participants gave the same response. While Atlast.ti allowed for querying and filtering through codes and code families, it also displayed the various codes within a code family through a network view diagram. This helped to visually reveal the codes that were most frequently used, or in other words, to discover the most commonly mentioned responses. This information could then be analyzed and any patterns emerging could then help answer the study questions. The next section discusses the various technologies that the participants used for teaching purposes by showing a network view of the relevant code family and analyzing the responses of the participants

4.2.3 Other Educational Technology Used

The main purpose of this research study was to examine the factors that influence technology adoption amongst foreign language instructors and, in

particular, the effect, if any, that their professional social networks have on their decisions to use technology. However, in order to explore the influential factors, it was necessary to first determine the total number of various educational technologies each participant had adopted. Table 4 showed how actively each participant used WebCT Vista by providing the total number of different WebCT Vista tools used in 2010 and 2011. However, since the observational data collection was limited to WebCT Vista usage, other educational technologies that the participants may have used could not be observed. During the interview, therefore, each participant elaborated on the other educational technologies that were used for teaching purposes. As mentioned in the previous section, interview transcripts were coded using the qualitative analysis software Atlasti. A new code was created each time a new technology was mentioned and then later the codes formed a code family (CF) called "other educational technology used". Figure 4, shows a network view of this code family providing an overview of the various educational technologies that the participants shared that they used in addition to WebCT Vista. The number next to each type of technology, or code, indicates how many participants mentioned that they used that particular technology.

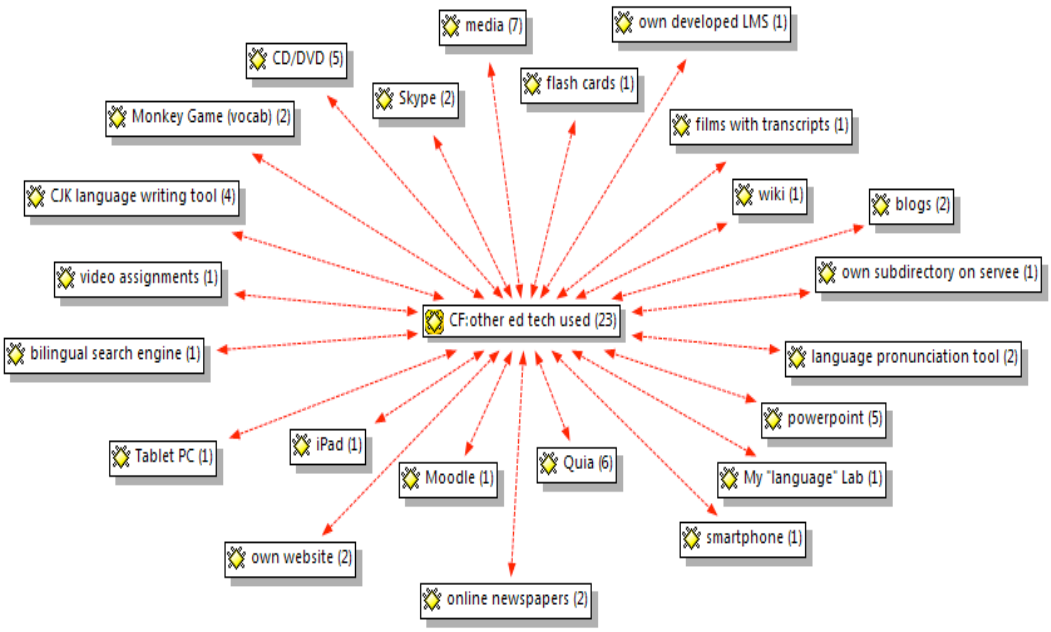

Figure 4. A network view of all other technologies used

Figure 4 shows that during the interviews, participants, altogether, listed 23 different types of educational technologies that they had selected to use for their teaching purposes in addition to WebCT Vista. While most of the technologies only had one or two adopters, some of them were more widely used. For example, seven participants indicated that they used online media referring to audio or video in particular. As one instructor, i6B explained: "[t]here are other things like movie clips on YouTube that you can use or even other things, doesn't have to be movie clips - there's so much stuff on YouTube". Another technology, Quia, was popular with instructors, particularly in Department B, as one language coordinator, c1B, described in the excerpt below.

Coordinator: The Quia system is attached to our language program with one of the textbooks and students have their code and at the beginning of the

> term they get instructions and how to register and then do the required exercises.
>
> **Interviewer**: That's for the first year courses?
>
> **Coordinator:** Uh, yes, that's the textbook we use for the first year and a half because there are twelve chapters we have to split that up into three terms, so it would encompass the first and second year language courses and the Quia has great exercises for the language program I must say that and before the course starts I go into each chapter and there are certain exercises which are mandatory for students to do and they have, and I set the date. I manage all that I mean in that sense I think Quia is great.

As mentioned in the previous section, 4.2.2, the first year courses in Department B were set up by the coordinator and all instructors were required to use the same technologies. Many of them therefore used the Quia system along with WebCT Vista, since it was developed by the publisher and provided exercises and chapter tests. Earlier in the chapter in section 4.2, the observational data showed that one participant in Department A, i4A, did not use WebCT Vista at all. In the interview this instructor mentioned that, instead of using WebCT Vista, Quia and another platform called My Language Lab were used instead. The instructor elaborated:

> Currently, I am using two learning management systems and they're offered through the textbooks so they were used for 100 level courses and a different one for the 200 level. So I'm not currently using Vista just because, and I hope it doesn't distract from what you are researching,

> mostly because the publishers have developed as you can imagine, they developed a lot of resources and many of them very good actually, not all of them but lots of them are quite good and for the amount of money it appeared not to be too much on top of the regular textbook. The students had access to a lot of online resources that the publisher had developed. So one is called My Language Lab and the other one is called Quia… Now I am looking at moving away from Quia and probably expanding or using Vista as a tool mostly because I'm a little uncomfortable with the notion that student information is actually hosted in another country through these systems and that's making me nervous.

Relying on the observational data alone, it would appear that this instructor did not adopt educational technology at all. However, the interview data helps explain that the instructor had, in fact, adopted educational technology that the textbook publishers provided. In addition, the instructor had recently learned that Quia hosted students' information in another country and the instructor was considering using WebCT Vista instead, since it was hosted locally at the educational institution.

Figure 4 further shows that the participants used a wide variety of educational technologies, but that most of the technologies were adopted by one or two participants only. For example, one instructor, i5C, used a language pronunciation tool that helped students to review and practise proper pronunciation. As the instructor stated: "[i]t'll give you how to generate a correct sentence then it'll give you feedback exercises. You can do your feedback

exercises. They're not graded but they're very important". A language coordinator and instructor shared that students submitted video recordings of their presentations rather than doing in-class presentations. The coordinator, c7C, explained that: "[t]hey can practise and videotape themselves many times until they feel satisfied. If they are giving the performance in the classroom they might get nervous or have mistakes, so I think doing videos actually increases the quality of their performance". Hence, the interviews allowed the researcher to learn about the various other educational technologies that each participant used. The next section joins the observational data collected from the WebCT Vista environments with the interview data discussed in this section to determine which participants were high technology adopters and which had adopted less technology.

4.2.4 Technology Adoption Amongst Participants

As shown in Table 4, looking at the total number of Vista tools that each participant used provides some indication to how much educational technology they had adopted. However, the data is quite limiting, as some instructors may have used many other educational technologies in addition to WebCT Vista. As discussed in the previous section, the interview data fills this gap and shows what other technologies the participants had adopted. To determine how much technology each participant had adopted, the researcher added the total number of other educational technologies that each participant discussed in their interview to the total number of tools the observational data showed that they used in WebCT

Vista. Table 5 below shows the total quantity of technology adopted by each participant.

Table 5

Total Technology Adoption of Each Participant

Department A				Department B				Department C			
ID	Total Tech Used	Vista Used	Other Tech Used	ID	Total Tech Used	Vista Used	Other Tech Used	ID	Total Tech Used	Vista Used	Other Tech Used
c1A	8	6	2	c1B	4	3	1	i1C	9	7	2
i2A	12	7	5	i2B	6	4	2	i2C	6	2	4
i3A	4	3	1	c3B	5	3	2	i3C	2	1	1
i4A	3	0	3	i4B	4	3	1	i4C	9	6	3
				i5B	7	3	4	i5C	5	2	3
				i6B	8	6	2	c6C	5	4	1
				i13B	6	5	1	c7C	11	7	4
								i8C	5	5	0
								i9C	9	7	2
								i10C	8	6	2
								i11C	4	3	1
								i12C	9	8	1

Note. Tech = Technology

Table 5 shows that there is a broad range of types of technologies used. From one instructor, i4A, only using three different kinds of technologies to one

coordinator, c7C, using 12 different technologies. Knowing which participants had adopted many educational technologies (WebCT Vista or other technologies) and which had not helped reveal any patterns or trends emerging from their professional social networks, which is the focus of the second research question discussed in the following section.

4.3 Research Question #2: The Role of Social Networks

The second research question that this study investigated focused on the effects of instructors' social networks or technology-related discussions on their technology adoption decisions. Specifically, the question asked,

ii) In what ways does communication with colleagues about educational technology, or their professional social networks, affect foreign language instructors' technology adoption decisions?

To begin answering this question, social network analysis was used to discover what patterns, if any, emerged from comparing the social networks of the participants who adopted many technologies and those who used fewer ones. In *Chapter Three: Methods*, social network analysis was explained as a way of discovering the similarities and differences between relationships or ties between colleagues and determining the instructors with high betweenness centrality assisting the flow of information across a network. In order to know with whom each participant talked about technology, each participant completed a pre-interview questionnaire that included a list of all the language instructors in their department. The participants indicated with whom they spoke about technology

generally. This data was then put into a spreadsheet and using a social network analysis software application, Gephi, sociograms of each department's network were created revealing the participants' ego networks, the departmental networks, and the betweenness centrality of each instructor.

As mentioned previously in Chapter Three, if all instructors in a department do not participate in the study, then whole social network analysis cannot occur. Since only a sample of the instructors in the departments volunteered to participate in the study, partial departmental social network analysis occurred instead. However, considering the number of technologies each participant had adopted and their particular location or centrality in the departmental network, helped decipher any emerging patterns. The next section of the chapter focuses on the social networks of the three language departments and the betweenness centrality of each participant.

4.3.1 Departmental Social Networks

In order to begin investigating whether instructors' discussions about technology play any role in their technology adoption decisions, the ego networks of each participant and the departmental social networks were analyzed for any emerging patterns. These social networks illustrate the flow of information across a network highlighting the instructors who were in an intermediary position connecting one side of a network to another. Such instructors had a high betweenness centrality and were represented by a larger node. Furthermore, it is important to consider the number of technologies each participant had adopted based on the observational and interview data reported earlier in the chapter in

Section 4.2.4. Comparing the betweenness centrality of the participants who used a greater number of technologies to those who used fewer ones helped reveal any trends among the instructors and across the departments. Figure 5 is a sociogram of the partial social network of Department A.

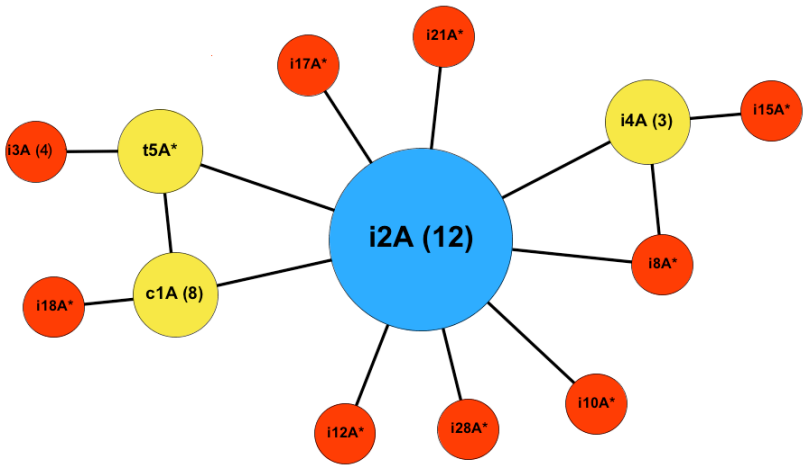

Figure 5: Sociogram of technology-related connections in Department A

Figure 5 shows with whom the four participants in Department A spoke about technology, based on the information they provided on their pre-interview questionnaire. The nodes on the sociograms represent either the participants or the other instructors in the department (i.e. their colleagues) with whom they talked about educational technology. A non-identifying number in the centre of each node identifies each instructor, while the number in brackets refers to the number of educational technologies they had adopted as previously shown in Table 5. An asterisk next to the non-identifying number indicates that the particular instructor was not a participant in this study and, therefore, information concerning with whom that person communicated and how many technologies they used was not available. The lines between each of the nodes represent a connection or

relationship. However, due to data being limited to information shared by the four participants, there may have been more connections between the colleagues.

The size and colour of the nodes visually represent the betweenness centrality of each participant. For example, the large blue node in the centre (i2A) shows that this participant had the greatest amount of betweenness centrality, since this node has an intermediary role connecting the left side of the network to the right side. In addition, this instructor spoke with nine colleagues, three of whom have technology-related conversations with one other person as shown by the yellow nodes. Hence, the information discussed between i2A and these three colleagues could have been further shared with others, for instance, between the yellow and red nodes. This instructor, i2A, had also adopted 12 technologies, the greatest number in this department. Meanwhile, c1A, who had also adopted fewer technologies than i2A, but more technologies than the other instructors (eight in total), had a lower betweenness centrality. This is due to the instructor speaking with fewer colleagues about technology and, therefore, not acting as an intermediary assisting in the flow of information across the network. Likewise, i3A, who was a low technology adopter, also had low betweenness centrality. Since this instructor only talked with two other colleagues, there was less opportunity for this instructor to share information with others. Based on the network analysis of these three participants and the number of technologies they had adopted, it appears that instructors who used more technology tended to have greater betweenness centrality. The only exception to this trend was i4A, who had adopted a low number of technologies, yet had a betweenness centrality

comparable to c1A who had adopted many more technologies. The next section discusses the partial social network of Department B, to determine if there is a similar pattern of high technology adopters having greater betweenness centrality and therefore being in a position of spreading information across the department network.

The following sociogram shows the partial social network of Department B and the various technology-related ties that the participants had with their colleagues.

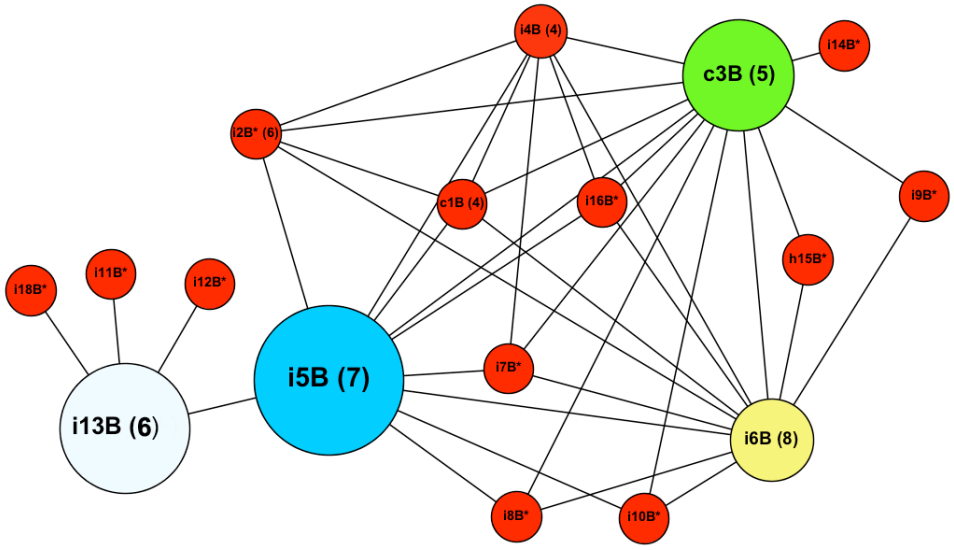

Figure 6: Sociogram of technology-related connections in Department B

In Figure 6, the large blue node indicates that i5B had the greatest betweenness centrality in the department since the node representing this instructor connects the right side of the network to the left side. This was the only instructor in the department who spoke with i13B, represented by the white node, as well as with many others on the other side of the network. Consequently, i5B

could act as an intermediary or broker of information and therefore had the greatest betweenness centrality in the department. This also means that i5B had the responsibility, to some extent, to share information between i13B and the other instructors who otherwise may not have had access to the same information. With respect to technology adoption, this could mean that i13B did not have an opportunity to learn about the technologies that the other colleagues on the right side of the network have used unless i5B shared this information. In addition, since i13B in turn spoke with three other instructors, represented by the red nodes, who did not have any connection with anyone else in the department, the information learned from i5B could have been further shared with these three other colleagues. Hence, the exchange of information between i5B and i13B was critical for the rest of the participants in i13B's ego network to receive the same technology news. Therefore, i13B had the second highest betweenness centrality in the department.

The instructor with the third highest betweenness centrality, c3B, represented by the green node spoke to a great number of colleagues about technology. However, the node representing c3B is not in an as much of an intermediary position as i5B, since the other colleagues that this instructor spoke with also had conversations with i5B. Therefore, c3B's colleagues did not have to rely on c3B to share as much information, since i5B was in a more central position offering news from the left side of the network as well.

Considering the number of technologies that each of these instructors had adopted, along with their betweenness centrality, shows a similar trend emerging

as was revealed in Department A. It appears that the betweenness centrality of these three instructors had a relationship with their technology adoption. The greater their betweenness centrality, the higher the number of technologies that they had adopted. However, there is an exception to this trend, since i6B represented by the yellow node on Figure 6, had adopted the greatest number of technologies in this department, yet had a much lower betweenness centrality than these three other instructors. In addition, c3B was one of the language coordinators and as previously discussed in Section 4.2.1, the first and second year courses in the department follow the same teaching strategies and instructors were required to use the technologies arranged by the coordinator. Hence, c3B's role as a language coordinator may explain why this instructor had greater betweenness centrality than i6B who used a greater number of technologies. Interview data from c3B, discussed in the next chapter, will show the types of discussions that this coordinator had with the instructors. The next section explores the social network of Department C.

The following figure illustrates the partial social network for the third language department in the study, Department C. As with the sociograms for Departments A and B, the large blue node represents the instructor who had the greatest betweenness centrality in the department and, therefore, helped spread news about educational technology across the network and potentially influenced others' decisions.

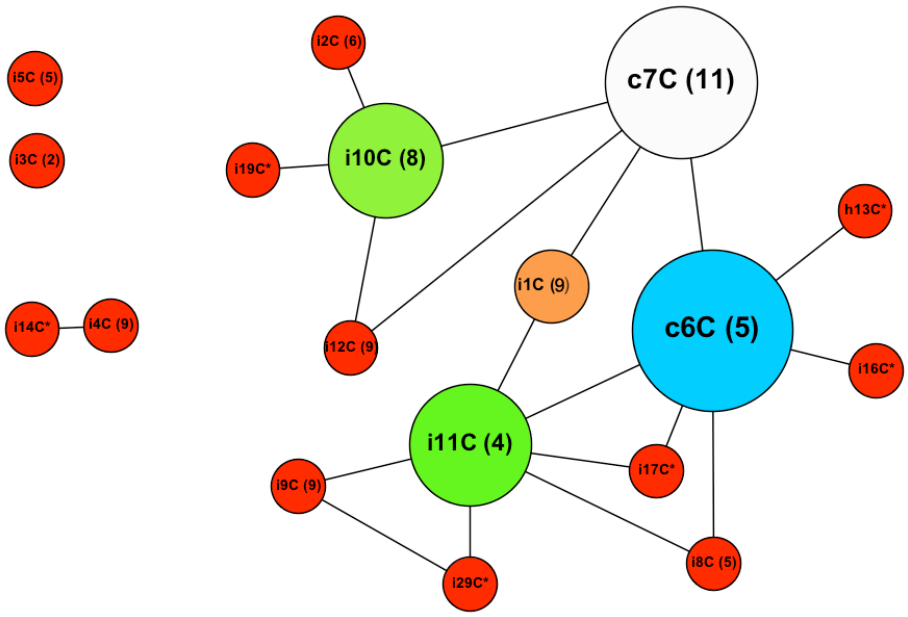

Figure 7: Sociogram of technology-related connections in Department C

As illustrated in Figure 7, the blue node represents c6C who had the greatest betweenness centrality. This was due to this instructor connecting the ego networks of c7C (the white node) and i11C (the green node at the bottom) together by not only speaking directly with i11C, but also speaking with two other colleagues, i17C and i8C, who were also within i11C's ego network. Hence, the node representing c6C is in an influential position in the network, since this instructor could share information across the departmental network by speaking with a number of colleagues. As can be seen in Figure 7, the small orange node representing i1C is also in an intermediary position connecting the ego networks of c7C and i11C together. However, i1C's betweenness centrality was much lower than c6C since i1C only spoke with two colleagues, and therefore, had less opportunity to spread information.

While c6C had the highest betweenness centrality, this instructor was also a language coordinator, and therefore, the additional responsibilities may have made this instructor more central in the department. Similarly, c7C was the other language coordinator in this department and had the second highest betweenness centrality in the department. While of both of these language coordinators had a critical position in the department that influenced the flow of information, they used a very different number of technologies. While c6C used five technologies, c7C used 11 different technologies and was the highest technology adopter in the department. Likewise, i11C and i10C had the same approximate betweenness centrality, as illustrated by the green nodes in Figure 7, yet used four and eight technologies respectively. Hence, unlike in Departments A and B, a pattern relating technology adoption and betweenness centrality does not emerge in Department C. Furthermore, there are a number of red nodes in Figure 7 representing high technology adopting instructors (i4C, i9C, and i12C) who had very low betweenness centrality. According to the pattern revealed in Departments A and B, these three instructors should have had high betweenness centrality. However, the opposite seems to be happening in Department C.

Based on the above analysis it appears that a trend showing a relationship between the numbers of technologies an instructor had adopted and their position in a network, such as their betweenness centrality, does not emerge. It is also important to note that, as mentioned earlier in the chapter, unlike the instructors in departments A and B, the instructors in Department C had the option of using a WebCT Vista site designed by the language coordinators or to use their own sites,

selecting the technologies they felt were appropriate for their courses. This different departmental approach towards integrating WebCT Vista with on-campus language instruction may have affected the types of conversation instructors had with one another and the lack of pattern between technology adoption and betweenness centrality in Department C. In-depth interviews with the participants will provide more information about the types of conversations they had with their colleagues within and outside of their academic departments. This will help gain better insight on the role that conversations with colleague may have on the instructors' technology adoption decisions.

4.4 Summary

The observational data discussed at the beginning of this chapter showed how extensively foreign language instructors used WebCT Vista. Adding to this data, interviews helped determine the other types of educational technologies the participants used and which participants had adopted more technology than others. Examining the participants' ego networks within the partial departmental social networks explained with whom they had technology-related conversations and, therefore, how information flowed through the departmental network. The analysis has shown that a wide-scale pattern has not emerged. Instead, the pattern that emerged in Departments A and B showing that the high technology adopters tended to have greater betweenness centrality and, therefore, greater influence on information flow, was not discovered in Department C. It is also important to recall that there were only four participants (13%) representing Department A and hence the results may not provide a completely accurate picture of the

conversations colleagues had with one another. The participants in Departments B and C, however, represent a much higher proportion of instructors (44% and 41% respectively) and, therefore, their responses and partial social networks provide a more accurate representation of the conversations around technology that they had or choose not to have with their colleagues. The next chapter explores the data from the interviews with the participants around the types of technology-related conversations they had with their colleagues in and outside of their departments. This in-depth investigation of their conversations will further help determine the role, if any, that conversations with their colleagues may have on how information about technology is shared and ultimately influences their technology adoption decisions.

Chapter Five: Conversations about Educational Technology

The previous chapter analyzed the departmental social networks to determine any patterns on how information flows between the participants. The analysis presented an emerging pattern in Departments A and B, where instructors who had adopted a greater number of technologies tended to have an influencing role on how information travelled across their department or higher betweenness centrality. On the other hand, Department C's partial social network did not show an emerging relationship between technology adoption and betweenness centrality. Therefore, further data collection through interviews was required to gain a better understanding of the types of conversations the participants had with their colleagues, both within and outside of their academic departments.

As indicated in *Chapter Three: Methods*, the semi-structured interviews loosely followed pre-determined questions (Appendix A) meant to guide the interviews. For all the interviews except one, where the participant chose not to answer any questions regarding conversations with colleagues, answers on the pre-interview questionnaires, along with the guiding interview questions, prompted discussion concerning the types of conversations participants have had or have not had with their colleagues. If participants responded that they had very few conversations with colleagues, they were asked if they spoke with colleagues outside of their department. In addition, the participants were asked to share information about the types of conversations they had prior to using WebCT Vista and how they were initially introduced to the learning management system. As mentioned in the previous chapter, interview transcripts were analyzed using a

software program, Atlas.ti, with codes emerging from within the participants' responses. These codes were grouped into clusters or code families depending on which interview questions they answered. These code families are discussed in turn below.

5.1 Conversations about Educational Technology

Interviews with the participants helped explain how frequently the participants had technology-related discussions at the time this study was conducted and with how many colleagues they had such conversations. Figure 8 shows the code family "discussions about ed tech now" which includes seven codes representing responses given during interviews.

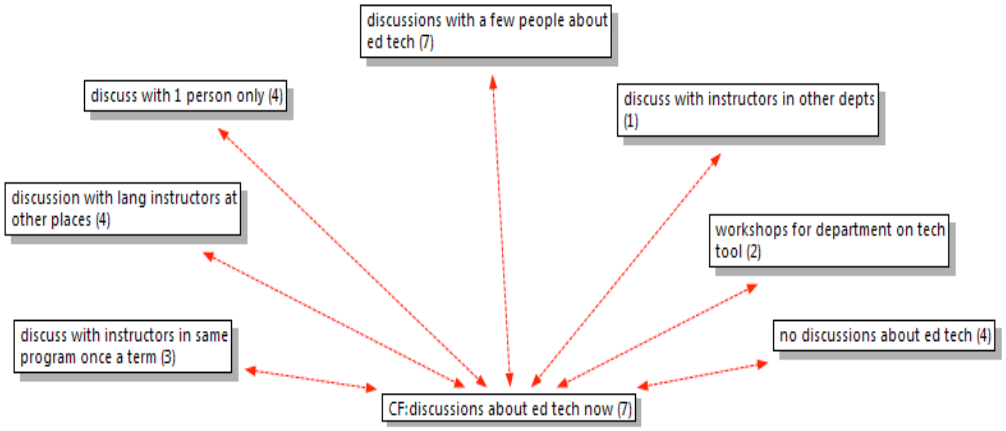

Figure 8: A network view of discussions about educational technology

In Figure 8, the node in the centre beginning with "CF" refers to the code family that the figure represents. The numbers next to each code or node in the network view represent the total number of participants who indicated in their interviews that they had such types of conversations. For example, seven

participants responded that they had discussions with a few people about educational technology. As one instructor, i10C, commented: "[w]ith my colleagues we share the same office space so who's right next to our office, so if we have time to see each other sometimes we talk about what technologies we can use". The language coordinator, c6C, who talked to many colleagues about technology, said in the excerpt below that although there were discussions with many people, they were not frequent.

> **Interviewer**: In the questionnaire you've indicated that there are certain people that you talk to about technology quite a bit
>
> **Coordinator**: I can't say it's quite a bit…I have time to talk to them but it's not like we constantly discuss, definitely no.

Similarly, an instructor, i13B, from Department B who talked to a few colleagues about technology shared: "[y]es, some of my colleagues have introduced Vista to me, and I've been using it ever since. I occasionally discuss Vista with them, not regularly". Like c6C, this instructor, also did not have frequent conversations about technology.

While there are seven participants who have had technology-related discussions with a few colleagues, there are four participants who did not initiate any conversations about technology. One of these participants, i3C, explained: "I just explore it myself for my own fun that's about it". Similarly, another participant from Department C, i5C, who did not have conversations with others, explained: "[m]y predecessor for the other course, i14C, is away and the system is

very busy right now and we already have all the tools so we really don't talk about it". Since, i5C's colleague who taught the same language was away, there wasn't really any need or opportunity for further discussion. Another instructor, i8C, clarified the reason for not initiating technology-related discussions in the excerpt below.

> **Interviewer:** Do you have an idea as to why you don't talk to colleagues about technology?
>
> **Instructor**: Yes, because we have about same amount of knowledge and I'm not quite sure their knowledge is correct or not so it's much easier to come to the ISIT department and ask and get correct answer instantly.
>
> **Interviewer:** So you come to ISIT instead of going to the colleagues?
>
> **Instructor**: Yes exactly. They may find solutions from trial but it may not be the best solution. To get the best solution quickly I come to the ISIT office.

This instructor preferred to talk to technology experts at the local educational technology unit in order to have quick assistance, rather than asking questions to colleagues who may not give the best advice. Furthermore, while i8C did not initiate discussions with colleagues, this participant commented that others have approached the instructor with technology-related questions. This is explained in the following excerpt.

> **Interviewer:** And does anyone talk to you about technology?

> **Instructor**: Yea, if they have some simple problem with Wimba or other Internet technology, then they ask, but basically I just come to ISIT.

Therefore, it appears, that while other instructors asked questions to i8C, this instructor preferred seeking technology advice from the educational technology unit. Similarly, i2C, who did not initiate conversations with anyone said:

> So, I think generally speaking I'm good at learning computer things, software. I learn pretty fast, I think, if someone show me and teach me to do it a couple times I should be able to figure it out generally speaking. And I felt I like to learn from professionals in the computer area and, so I don't really do a whole lot with my colleagues.

Based on the excerpt above, like i8C, i2C also preferred consulting with the experts at the educational technology unit rather than seeking advice from colleagues. However, both of these instructors may have had discussions about technology previously. Technology-related discussions prior to using WebCT Vista are explored later in this chapter.

Returning to Figure 8 and the codes emerging from the transcripts, four participants mentioned in their interviews that they had technology-related discussions with only one colleague. One of these instructors, i3A, explained: "because we have here in the department a technician who supports us when we start the course and when we want an online component, he will do the training for us. He will train us and support all the options". Hence, like i8C and i2C, i3A preferred to seek support and advice from the educational technologist in the

department rather than with other colleagues. The three other instructors are all from Department C. One of them, i1C, shared in the excerpt below that technology-related conversations occurred annually with one of the language coordinators.

> **Instructor**: We just showed each other that is it.
>
> **Interviewer**: Okay, after you started using it? Okay. And how often do you talk to c7C about it?
>
> **Instructor**: Once a year maybe.
>
> **Interviewer**: Once a year you kind of show each other about what you've done?
>
> **Instructor**: If there's something new.

While i1C had annual discussions with the language coordinator, another instructor, i4C had technology-related conversations with only one other colleague, as well. This instructor elaborated:

> I'm probably the first person to get a PC or actually to get a MAC and it's always been an expectation. So my conversations and discussions come mostly in terms of people coming in and asking me. Although somebody younger like i14C was the one that put me on to the software for films so I mean i14C is at least up on these things as I am. But no, there's not a great deal of discussion about that.

The excerpt shows that i4C was generally one of the first instructors in the

department to adopt a new tool or hardware. However, since another colleague, i14C, also had many ideas for using different technologies, i4C preferred to have conversations with i14C only. The third instructor in this department, i9C, who only talked to one other colleague, specified below that the discussions occurred because they were designing a course together.

> **Interviewer:** So, in your questionnaire you indicated that you discuss educational technologies with i29C quite a bit?
>
> **Instructor**: Oh yeah, cause we are working on designing a course.

The excerpts discussed above help explain why some of the participants had technology-related conversations with a limited number of colleagues. However it is not known if these three instructors had technology-related conversations prior to using WebCT Vista. The next section, 5.2, may show that i1C, i9C, and i4C had discussions with colleagues about technology prior to using WebCT Vista.

Unlike the instructors in Department C, the instructors in Department B generally had conversations with many colleagues. In particular, three instructors in Department B specified in their interview that once a term they would get together with their peers and would discuss their commonly-taught courses, including the use of technology. One instructor, i6B, explained:

> In our unit, at the end of each term, we get together with the instructors and we talk about the term, we talk about the things that were good and we talk about the things that can be better and we discuss changes and what changes we could do and how we can implement those changes. I can't even count

> the number of times we have talked about WebCT because of technical difficulties.

One of the language coordinators, c3B, further mentioned: "[w]ell we get together regularly as teachers, we have meetings at the beginning of term and at the end of term and we certainly discuss it [technology] then". Another instructor, i4B, further stated in the excerpt below that there were regular meetings twice a year to discuss the changes to technology.

> **Interviewer**: How often would you say that you meet with all the others who teach the same course?
>
> **Instructor**: Yeah, we meet…well we have fixed meetings that are at least once a year, usually twice a year.
>
> **Interviewer**: And in those meetings do you discuss what tools to use?
>
> **Instructor**: If there's any changes

The excerpts from the interviews of these three instructors show that instructors in Department B who taught the same courses met once a term to discuss the technology they would use the following term.

While the content analysis to this point has shown that some instructors had technology-related conversations with more colleagues than other, it does not explain the technology-related discussions that took place outside of the academic departments. As Figure 8 on shows, four participants indicated having discussions with language instructors in other places and one instructor had discussions with

instructors in other departments. The one participant who had opportunities to discuss technology with colleagues in other departments, i4A, mentioned: "[w]ith a colleague in my department, we co-chair a second language acquisition cluster so through that I do meet with other colleagues who teach languages". It appears that, since i4A was involved with a second language cluster, there were opportunities to discuss teaching methods, including technology, with instructors in other language departments.

Four instructors mentioned in their interviews that they had opportunities to discuss educational technology with language instructors in other places. One instructor, i12C, had technology-related discussions with a very limited number of colleagues within the department. However, this instructor had opportunities to discuss educational technologies with language instructors elsewhere as explained in the excerpt below.

> **Instructor:** This July, the government in our home country offered many, many classes for all the instructors from the whole world. They pay tuition, living, hotel, eating, travel, tickets so several instructors went there.
>
> **Interviewer**: So what were they teaching?
>
> **Instructor**: They use many new technologies and in this summer I also learned a lot from them there.
>
> **Interviewer**: And did you meet other language instructors from other places too?

> **Instructor**: Yeah, different countries. At that time I met from nineteen countries, the instructors.

Like i12C, one of the language coordinators in Department B, also did not have many discussions about technology with colleagues in the department but, instead, had conversations with instructors in other places. This coordinator, c1B shared:

> You see, I'm not technologically inclined, but I seem to get my expertise and find interesting people outside of the department. As a matter of fact yesterday on the weekend, I went to a conference and there was also a talk by the head of a language institute and she made me aware there is a workshop going on soon about "the virtual classroom and blended learning" with generous funding. Guess where I'm going? So, yeah, you see, that's where I get my input.

This coordinator learned about new technologies from conferences and instructors at other institutions. Likewise, one of the language coordinators in Department C, also heard about new technologies from instructors in other institutions. This coordinator, c6C described:

> I'm on a mail list. It's mainly joined by language teachers mainly from North America and, then sometimes they have some interesting information. For example these days, blogging or kind of language partner online or language partners through Skype or through various technologies it's there and they open it to other people to use. So, when I go to conferences I find

> out about this information, then I'll bring back the handouts or the information and I will share with instructors. That's about it.

This coordinator received a lot of information about new technologies from language instructors on a mailing list or at conferences and then shared the information with colleagues in the department. Like c6C, an instructor in Department B, i5B, also had discussions with many instructors in the department but also spoke with instructors in other places. The instructor specified: "I have plenty of support because I'm part of a trainer network for language teachers and I am a trainer for language teachers so I meet up with that network maybe twice a year. They are very supportive". Therefore, it seems that while i5B had technology-related discussions with colleagues in the department, instructors in the trainer network provided further support.

Finally, the last code in the code family "discussion about ed tech now" represents the two participants that mentioned in their interviews that they shared and discussed technologies when they attended workshops in their department. One language coordinator, c7C, who organized a workshop on effective use of PowerPoint for instructors in Department C specified:

> We had eight instructors come into the workshop just to see what PowerPoint can do for us, what kind of skills we need to learn and this Friday, we are having a show-and-tell presentation workshop so each one will present a course work like a class plan on PowerPoint.

From the interview, it is apparent that, while one-on-one discussions may have been limited for this coordinator, during workshops there were opportunities to share ideas with many others. Likewise, one of the instructors in this department, i12C, who attended the PowerPoint workshop, and also happens to have had limited technology-related discussions, further elaborated in the excerpt below.

> **Instructor**: Last month c7C organized a training workshop I think twice. Once, I just shared the jeopardy, the PowerPoint we use.
>
> **Interviewer**: Okay, so you can see what other people are using?
>
> **Instructor**: Yes, that's good. That encourages us to use that.

From the excerpt above it appears that, like c7C, this instructor did not discuss technologies with many colleagues individually, but instead shared ideas with colleagues during a workshop. Furthermore, it was noted earlier that this same instructor, i12C, had opportunities to discuss technologies with language instructors from other countries.

This concludes the analysis of the types of technology-related conversations the instructors had with their colleagues at the time when the interviews occurred. The next section explores the types of conversations the participants had prior to using the learning management system, WebCT Vista, the main educational technology that most instructors used in some capacity, as reported in the previous chapter. Discovering the types of conversations participants had previously may show whether those, such as the four language instructors in Department C, who did not share or discuss technology with

colleagues at the time the interviews were conducted, may have done so previously. This will further help determine if conversations about technology have played a role in influencing technology adoption decisions amongst foreign language instructors.

5.2 Conversations about Educational Technology before the LMS

The previous section presented excerpts from the interviews that explained the types of technology-related conversations participants had when the interviews occurred. To continue the quest to determine if conversations with colleagues influenced their technology adoption decisions, this section explores the types of conversations, if any, instructors had with their colleagues prior to using the current learning management system, WebCT Vista or its previous version, WebCT. Figure 9 illustrates the code family, "discussions about educational technology before WebCT/Vista".

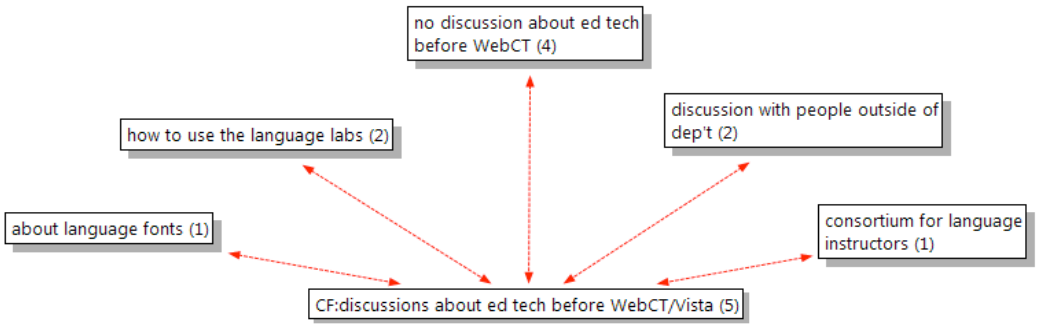

Figure 9: A network view of discussions about technology prior to the LMS

Figure 9 shows five codes emerging from the transcripts through content analysis. The most common code, used in four of the transcripts, represents the participants who indicated that they did not have any discussions about

educational technology prior to using WebCT or WebCT Vista. One of these participants, i1C, discussed technology with only one colleague when the interview occurred and also mentioned that previously there were not any discussions, as shown in the expert below.

> **Interviewer**: Did you have these kinds of conversation prior to using WebCT?
>
> **Instructor**: With who?
>
> **Interviewer**: With c7C?
>
> **Instructor:** No.

Similarly, another instructor, i2C, who did not initiate any conversations about technology with colleagues when the interview occurred also, did not have such conversations previously. This instructor shared: "Uh not very much. I think I discuss it with the professionals here at [the educational technology support unit] but I felt like I am the first person to use WebCT in my department, I think". This instructor felt they were the first person in the department to use WebCT and therefore preferred to discuss it with the technology experts at the local instructional support unit. In the previous section, this instructor also expressed a preference for seeking advice from the technology professionals than from colleagues. Hence, both of these instructors, i1C and i2C, who both used many technologies, did not have many technology-related conversations at the time of the interviews and did not have such discussions previously either. The two other participants, who mentioned not having any previous conversations about

technology, indicated that they had some discussions at the time when the interviews took place. One of the language coordinators in Department B, c1B, stated: "[n]o, no. Because, first of all I'm here way way longer than they are". In other words, c1B did not have any discussions previously because the other language instructors who taught the same courses were not in the department at the time.

While Figure 9 shows that four participants did not have any conversations about technology prior to using WebCT Vista, two participants had previously had discussions about how to use language labs. One of the language coordinators in Department B, c3B, who also discussed technology with many colleagues when the interview occurred, explained the previous conversations around language lab use in the excerpt below.

> **Interviewer:** Would you recall having such discussions prior to WebCT? Was there any discussion about technology use in general?
>
> **Coordinator:** Yes, there was. I mean within language, the use of media is important. You don't have to go too far back although probably before your time, the language labs, do you remember exactly?
>
> **Interviewer**: Yes, I do.
>
> **Coordinator**: So, we were perhaps in there pretty early in our discipline and I don't know, again I think it's before your time, the multimedia centers that use to be in that B block that was language based, it was our discipline that started that. In that regard, yes.

> **Interviewer**: So lots of discussion as to how to set up the lab, how to use the lab?
>
> **Coordinator:** How to use it.

Like c3B, another participant was also heavily involved in determining the best use of language labs prior to using WebCT Vista. This instructor, i4A, who talked to a few people about technology at the time the interview was conducted, explained in the excerpt below the conversations about how to use the labs.

> **Instructor:** When we did have a visiting scholar for two years, a colleague from another university who came here and she was brought by two colleagues in my department with the idea of developing a website. So from '96 to '98 she developed a website which again wasn't that common at that point and so the fourth hour, the lab hour, and I was quite interested in that piece and I became friends with this colleague, so I would do the lab hour with her all the time.
>
> **Interviewer:** And the lab hour would be using this website?
>
> **Instructor**: The lab hour was using the website and it was quite a first here in terms of language instruction, no body else was doing it so we tried a lot of different things. She developed games, online games like the hangman for example and of course we started looking at newspapers online.

Hence, both c3B and i4A, who spoke to a few colleagues about technology at the time of their interviews, had many discussions about setting up language labs

prior to using WebCT. Similarly, two other participants indicated that they had technology-related discussions prior to using WebCT but it was with colleagues from other departments. One of these participants, i2A, also spoke to many colleagues about technology in Department A when the interview occurred. This instructor shared, in the excerpt below, about the types of conversation previously had with colleagues.

> **Interviewer:** Do you recall having such conversations before using WebCT?
>
> **Instructor**: Well, let's see, yes and no. That is not so much with colleagues but people outside of the department.
>
> **Interviewer**: Other faculty?
>
> **Instructor**: Yup, there was the teaching and learning enhancement…
>
> **Interviewer**: Teaching and academic growth? TAG?
>
> **Instructor**: No it's not TAG. It's this other one…anyway it was started by another department and it was to combine all the departments and take advantage of new technology. They developed a reading comprehension software, so I was associated with the designing the lab here and through those committees, of course there was a lot of discussion about what learning technologies meant and how they should be offered. So, I did a lot initially when the new facilities that are the language labs…the whole language lab was being replaced by the new language lab that's when there

was a lot of discussion. That was a long time ago.

From the previous excerpt, it is evident that i2A had conversations with many other colleagues outside of Department A about various software or designing of a language lab prior to using WebCT. Another instructor, i9C, who also only talked to one colleague about technology when the interview occurred, explained in the excerpt below about speaking with instructors outside of the department in the past.

Interviewer: Do you discuss educational technologies with anyone outside of the department?

i9C: Not lately, no.

Interviewer: Previously?

i9C: Previously at CILS.

Interviewer: That same department that you heard about WebCT?

i9C: Yea, they use to have workshops for us. There was a very famous professor from MIT who developed a very famous DVD storyline. He developed the reading course, online reading course, so I was part of that too developing reading courses in my language.

In the previous section, i9C explained having discussions with only one other colleague because the two of them were designing a course together. However, the excerpt above reveals that in the past, i9C had conversations with colleagues outside of the department. Such conversations focused on new technologies, such

as a DVD storyline for enhancing reading courses. Similarly, i5C, who did not discuss educational technology with colleagues at the time of the interview, had conversations with colleagues previously as well. However, unlike i9C who had conversations with colleagues outside of the department but at the same educational institution, i5C had discussions with colleagues located in other institutions entirely, as follows:

> The consortium I talked about in Australia was very good on that. So we actually could all communicate and give feedback. We could add to the textbooks, because they are publicly accessed, it was intentionally set up that way we could add to the textbooks we could comment on them and we could do all kinds of things and talk to each other. So, that's a consortium for the teaching of languages and it worked really well.

The excerpt above shows that like i9C, i5C previously had conversations with other language instructors but had very limited discussions at the time of the interview. Hence, while both of these instructors did not discuss educational technologies with their colleagues when the interviews occurred, in the past they had discussions that may have influenced their technology adoption decisions at that time.

Furthermore, another instructor in Department C who also only discussed technology with one colleague at the time of the interview, i4C, indicated in the interview of having conversations about technology with colleagues in the past. In the excerpt below, i4C described that the discussions in the past were focused on

others learning how to use language fonts.

> **i4C**: Yes. I think there were people who moved more quickly to using language fonts, the software on the computer would be a really transformative thing in these funny scripts.
>
> **Interviewer**: And these were an outcome of the conversations you had with them?
>
> **i4C**: Yes, but I mean this is years ago now and I mean all of those people would have gotten there eventually anyway just I was an early adapter.

In addition, in the interview, i4C further communicated that: "I'm usually the sort of the go-to person for other people's questions. I mean that's always been the case for anything having to do with computers in this department". Therefore, it appears that unlike i9C and i5C who had conversations with colleagues previously and learned about technologies that others were using, i4C's previous conversations were limited to this instructor informing others about technology, such as the language fonts. Regardless, the excerpt shows that i4C had more technology-related discussions in the past than when the interview occurred.

While this section focused on the discussions some participants had prior to using WebCT Vista, the next section investigates how the participants became introduced to the learning management system (LMS) in order to help determine if they became aware of the technology from hearing about it from their colleagues or from other sources.

5.3 Introduction to the LMS

One of the first guiding questions in all the interviews asked the participants to describe how they first heard about the learning management system, WebCT Vista, or its predecessor, WebCT. Figure 10 illustrates the code family "introduction to WebCT/Vista" and the six different ways that the participants first learned about the learning management system.

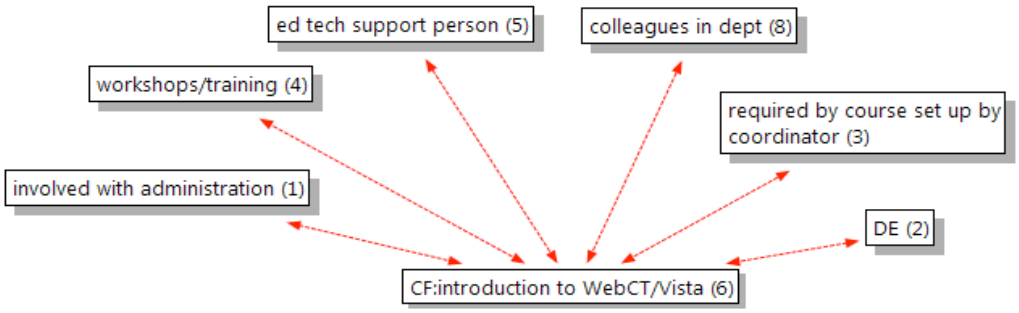

Figure 10: A network view of the ways instructors heard about the LMS

As Figure 10 shows, the most common way that the participants heard about the learning management system was through colleagues in their departments. Eight of the 23 participants mentioned in their interview that this was how they were first introduced to the LMS. For example, one instructor, i5B, shared: "I didn't know about it immediately and then it was mentioned at a staff meeting and I thought oh wow, there is something like that? I went and looked at it and that's how I started using it". Another instructor, i10C, stated: "I heard from some of my colleagues and also colleagues from other departments using WebCT so I thought it was a good thing to try". Similarly, another instructor, i1C, mentioned: "[o]ne of my T.A. and also another language instructor" while i12C also said: "I think

maybe first I heard from my colleagues, I can not remember who". One of the coordinators, c7C, mentioned: "[a]fter I came here some colleagues also introduced me to WebCT, we even had a demonstration presentation at the beginning of our departmental meeting". Likewise, another coordinator, c3B, described hearing about it: "[j]ust by picking it up along the way, hearing the name dropped by my colleagues". From these six examples, it is clear that a fair number of participants first heard about the LMS from their colleagues and therefore, such conversations, even if brief, may have influenced them, to some degree, to use the technology or to learn more about it. Furthermore, all of the participants who mentioned in their interviews that they learned about the LMS from their colleagues, had technology-related conversations when the interviews took place as well. However, while eight participants heard about the LMS from colleagues, the majority of the participants said that they heard about it from other sources.

According to the interviews and as shown in Figure 10, five of the participants mentioned learning about the LMS from an educational technologist at their local educational technology unit. For example, one instructor, i2C, answered: "I guess from an email and I come to the ISIT lab so often". Another instructor, i6B explained:

> When I came here one of the necessities was to overwork the placement tests content-wise. And then, I said it made sense to put them on the computer so that no one has to correct them. And then I had a conversation

with the person in charge of ISIT. I talked to him about what options would be there to do that. And that's when I think WebCT came up.

While these two examples from i2A and i6B reveal that some instructors learned about the LMS through conversations with educational technologists at their local educational technology unit, four participants mentioned learning about the technology from workshops or training sessions they attended. In the excerpt below, one instructor, i8C, shared that the introduction to WebCT came from a workshop.

Interviewer: And if you remember back, how did you first learn about WebCT?

Instructor: It was through workshop.

Like i8C, one language coordinator, c6C, also learned about WebCT from a workshop, as explained in the expert below.

Coordinator: Yes, the workshops. The boot camp or something like that.

Interviewer: From our office? Or another office maybe?

Coordinator: I think maybe back then it wasn't called ISIT, but yeah, Faculty of Arts

Interviewer: So that's where you first heard about it?

Coordinator: Right.

While, c6C learned about the LMS from a workshop held by a local educational technology unit, another instructor, i9C, learned about WebCT from a workshop held by another unit at the educational institution, as described below.

> **Interviewer:** How did you first get to know about WebCT in general?
>
> **Instructor:** Centre for Intercultural Learning. I can't remember the name.
>
> **Interviewer**: Here?
>
> **Instructor:** Yeah, here when it first opened, CILS center, we were all trained.
>
> **Interviewer**: So everyone in your department?
>
> **Instructor:** Our department, the whole campus yea, especially language courses.

While five participants learned about the LMS by attending a workshop or training session, three participants came to be introduced to it by hearing about it from their language coordinators since it was a required component of the course they taught. For example, one instructor, i4B, in Department B, where some of the courses followed the same teaching methods, explained:

> The coordinator told us about it [WebCT], all the staff. So, we have many courses that often are in first year for example, we have quite a few courses that are parallel. So we have several sections. And, then the coordinator would introduce it.

Likewise, while three participants learned about WebCT because it was part of the course they taught, two instructors became introduced to it through developing an online distance education course years ago that used the LMS. One language coordinator, c1A contributed: "[w]ell, first time was when I was teaching a correspondence course that used to be with distance education and they decided five years ago to put it online". Another coordinator, c1B, further elaborated, "[t]hrough having to teach a program which I initially didn't want to teach and which was also offered in distance education and that's now long time ago". Finally, one instructor became introduced to WebCT by being involved with the administration of it. This instructor, i4C described: "I was actually involved in the administration of the system and the politics of the system years before I had any use for it in my language classes".

From these examples from the interview transcripts, it is clear that most of the participants did not initially learn about the LMS through conversations with their colleagues but from other sources such as workshops, language coordinators, educational technologists, or distance education development. However, most of the instructors who learned about the LMS through conversations with colleagues, had technology-related conversations with others at the time the interviews occurred as well.

5.4 Summary

This chapter investigated the types of conversation the participants had at the time the interviews occurred and previously have had about educational technology and how they were initially introduced to the LMS. The content

analysis of the interview transcripts showed that while seven participants indicated having conversations with a few people about technology, four participants did not initiate any discussions at the time the interviews occurred, nor did they initially hear about the LMS from colleagues. However, one of these four instructors, i5C, indicated having technology-related conversations with international colleagues prior to using WebCT Vista.

Content analysis further helped explain why four participants had discussions with only one person but that previously, one of these instructors, i9C, had conversations with instructors in other departments and another instructor, i4C, used to give technology advice to colleagues. In addition, one of the four instructors, i1C, learned about WebCT from colleagues while the others did not. Furthermore, this chapter clarified that two participants, i12C and c7C, discussed technology with colleagues at workshops and that one of them also had such discussions at international events. In addition, both of these participants initially heard about WebCT from colleagues in their department.

According to the content analysis of the interview transcripts, it is clear that other than three participants (i2C, i3C, and i8C), all other participants regardless of how much technology they used, either had technology-related discussions with colleagues inside or outside of the department at the time the interviews occurred or had such conversations in the past, or initially learned about the LMS through conversations with colleagues. Hence, such technology-related conversations could have influenced the participants' technology adoption. It is important to note as well that one instructor, i3A, although initiated

conversations with one colleague in the department, this colleague was an educational technologist rather than an instructor or language coordinator. The next chapter further explores the factors that influence technology adoption decisions amongst foreign language instructors, including whether the participants felt that conversations with their colleagues influenced their decisions.

Chapter Six: Factors that Influence Technology Adoption

In the previous chapter, content analysis of the interview transcripts showed that most of the participants either had conversations about educational technology with colleagues in their department or from elsewhere at the time this study was conducted or had had such conversations previously. The interviews explained that all but three either had technology-related discussions with colleagues or had had such discussions prior to using a learning management system. Although the participants, for the most part, indicated having conversations about technology with colleagues to some extent, it was not clear if they consider such discussions to have influenced their technology adoption decisions. This chapter explores the critical factors that the participants shared in their interviews that influenced their decisions to use a particular technology for educational purposes.

6.1 Research Question #3: Influencing Factors

The third research question in this study focused on determining the overall factors that influence technology adoption amongst foreign language instructors. Specifically the question asked,

> ii) According to foreign language instructors, what are the factors that influence their adoption of a learning management system, such as WebCT Vista, or other educational technologies?

During each of the interviews, as participants discussed which technologies they had adopted for teaching, they also explained why they initially chose to use

them. Furthermore, the last guiding interview question (Appendix A) asked the participants to indicate the factors that influenced them to use WebCT Vista, in particular. The sections of the interview transcripts that related to why they chose to use certain technologies were coded through open coding to determine the most common factors influencing their technology adoption. Figure 11, below, illustrates the code family, "factors influencing technology adoption," that includes 13 distinct codes representing each influencing factor mentioned in the interviews.

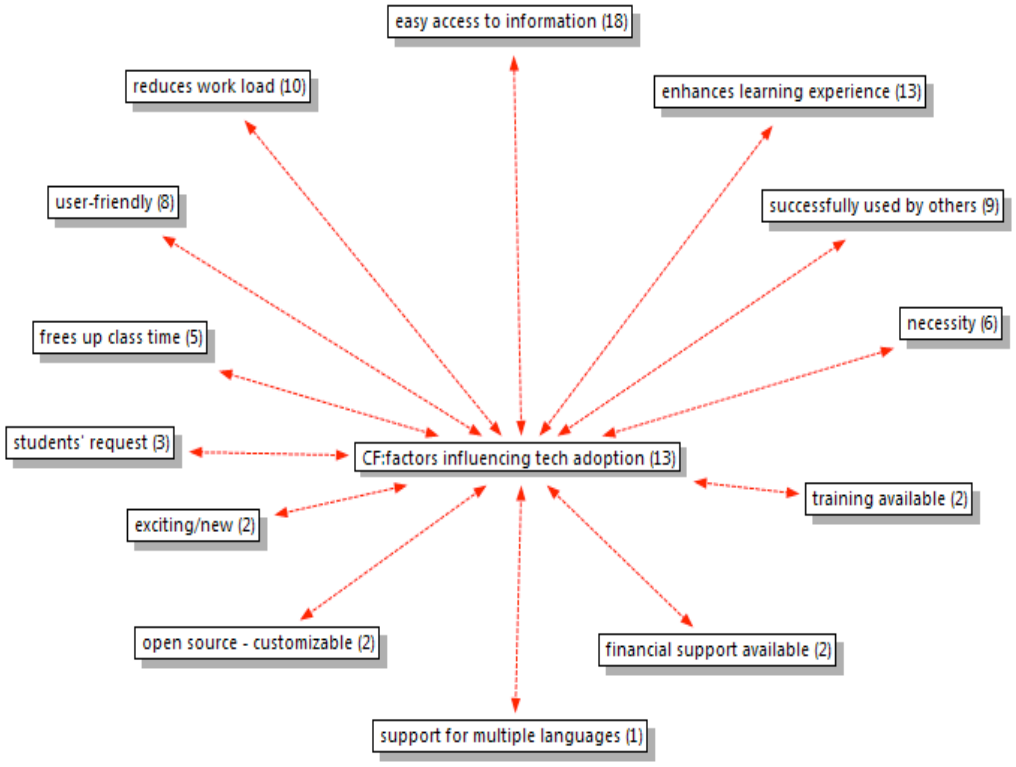

Figure 11: A network view of all factors influencing technology adoption

6.2 Most Common Factors Influencing Technology Adoption

At the top of Figure 11 sits the node representing the most commonly mentioned factor, "easy access to information". A majority of the participants (18 in total) indicated that one of the reasons they used online technologies, such as WebCT Vista, was because it allowed students to easily access course material at any time. As one instructor, i12C, explained: "I put homework there so the students can check whenever. If I send them by email, some students just maybe, you know, delete it by accident, so I just put it in Vista so they can find it anytime". Likewise, another instructor used WebCT Vista for homework and posting answer keys. This instructor, i11C, stated: "[s]ome exercises they do it at home and are supposed to check their answers. Then, if they have any questions, they can ask me in class". Similarly, another instructor, i13B, further clarified that: "[i]t [WebCT Vista] gives all students, even those who miss classes, easy access to important class material". WebCT Vista, also, allowed students to easily access their grades as one instructor, i8C, described: "[f]or example, the grade book, the students can monitor their achievement, they don't have to ask me or they don't have to record their own result themselves". These examples show that when instructors decided to use technology, it was important that it provided easy access to course-related information. In *Chapter Four: The Use of WebCT and Social Networks*, observational data of the participants' WebCT Vista environments showed that the learning management system (LMS) was most commonly used for uploading notes and documents (see Table 5 in Chapter 4). Therefore, it is not surprising that many participants indicated that they used

online technologies, such as WebCT Vista, because it was an easy way to share information with students.

The second most common factor that influenced the study participants (13 in total) to adopt a technology was whether it enhanced students' learning experience. For example, one language coordinator, c3B, explained that when selecting a technology to use it was important that it enhanced students' learning by helping them meet the intended learning objective or goal of a lesson, as described in the excerpt below.

> **Interviewer:** What are the particular factors that influence you the most?
>
> **Coordinator**: The main one is to see the technology as a means to an end and not the end itself. So, I ask myself, *what's my goal here and what's the best way to achieve the goal*? Sometimes, just because there's a new technology it isn't even sometimes the best means to my end, the goal. And, that's the first thing I ask myself.
>
> **Interviewer:** And, by goal do you mean the learning objective?
>
> **Coordinator**: Yes absolutely, the learning objectives.
>
> **Interviewer:** So that's the key driver?
>
> **Coordinator**: Yes, always for me. What's the best way to reach my objectives?

As with the coordinator, c3B, who evaluated a particular technology to ensure it met the intended academic goal, i4B, an instructor in the same department

ensured that incorporating a technology into the teaching and learning strategy was appropriate for the particular group of students. This instructor, i4B, elaborated:

> Well, so, what are the goals? Our target is to teach the students a language. Roughly there are four different approaches. So, there's listening, reading, writing and audience speaking. So, two inputs and two outputs. So, it depends on the topic. It depends on the quiz. It depends on the level of students. I'm always looking for the best approach for the students.

Similarly, another instructor shared that certain technologies were useful for meeting the learning objectives of a particular course. The instructor, i3A, explained:

> For example, one of my courses, I'm not teaching it this year, when I created it, I included a forum, because there are some cases that the students could discuss in that forum. In that way, I could see the interaction of a group of students and that was very useful for that course.

One instructor expressed that it was important for technology to be engaging so that students stay focused on their learning. This instructor, i6B, elaborated:

> I do think that it is one of our biggest challenges to make your teaching interesting. So, learning plus entertainment because, I'm sorry, but I think that's what the undergraduate students demand. I think that's what it needs to be these days. There are so many distractions. We call them distractions, right? The students, I think don't. It is difficult to get them to focus and to

> stay focused and by that I don't mean the 50 minutes in class. I mean also going home or going wherever and with all those distractions available not to forget to do their homework. So, that's what I think is the criteria.

Similarly, another instructor also felt that, when selecting technology, one important factor was how it could enhance the learning experience by making it more interesting, particularly since many students were using technology in their daily lives. This instructor, i5B, had recently chosen to use blogs and explained how the decision was made in the excerpt below.

> I went and looked at what other possibilities I have to make the class more interesting in the sense that, you know, to make it more creative and I think we have to keep up with all this because students are using all these things and if you want to talk the same language as them and make your classes interesting, you have to go and look at the these things.

From these examples, it is clear that prior to using a technology, many instructors were carefully evaluating it to ensure that it would enhance their students' learning experience by either helping meet the learning objectives or by making the lesson or activity more engaging and interesting. Hence, enhancing learning experiences was the second most common influencing factor. However, it was closely followed by another factor, reducing the workload of instructors.

Ten participants mentioned in their interviews that one of the main factors influencing their decision to use technology, such as a LMS, was its capacity to reduce their workload. Replacing printed material with digital copies posted

online minimized the organization required for making photocopies as explained by an instructor, i13B: "[i]t [WebCT Vista] saves paper, too. Prior to Vista, I had to print every handout and bring it to class for every student. Now, they could always check Vista or print the handouts themselves". Likewise, another instructor mentioned that one of the reasons for using a LMS was that it was easier on instructors when printed material was not needed. The instructor, i2B, clarified:

> It makes your life a little easier, for the teacher, you know? You don't have to take a lot of print outs with you. Right now, I do not make any copies for students. I ask them to please go online and print out everything. So, everything is online. One of the reasons, maybe.

While these two examples show that the reduction of printed material and the time required for organizing photocopying reduced the workload of instructors, automatic grading of online quizzes lessened the marking time of instructors. For example, one language coordinator, c7C, who developed online assessments in the LMS explained:

> So, we are learning the system to see how we could make the best use of it because we do have a lot of language learners and very limited T.A. time. So, this will really help the teachers to save time in marking all those objective answers, which could be done by the system.

Another instructor, i6B, used online assessments for the same reason: to reduce marking time. This instructor communicated that: "I thought it was very

beneficial, those WebCT tests, in terms of taking the marking load away from the lecturers". Similarly, another instructor had chosen to use WebCT Vista because it made calculating grades easier, as the instructor, i10C, described: "[t]he grade book saves me a lot of time. I used to have to do the calculation manually, now I put in all the grades after each test and that saves me time". While these examples show that a technology having the functionality to reduce the workload of instructors by minimizing the need for photocopies or saving them marking or grading time, was critical for technology adoption, a technology being user-friendly was another important factor.

Eight participants indicated that being user-friendly was a factor that influenced their decision to use a technology. As one instructor, i2A, indicates: "[w]ell, you know, obviously if it's user friendly or not and if you get the impression that it can deal with your problems quickly without too much fuss". According to this instructor, it was important for a technology to be easy to use without a great deal of difficulty. Another instructor, i5C further clarified this influencing aspect below.

> **Interviewer:** What really interests you or what factors do you look at when you're selecting which ones [technologies] to use?
>
> **Instructor**: Ease of putting things up. How easily can you put the documents up. How easily can you put up a link. Basically how easily can you set up a discussion group.

While these two examples show that it was important for instructors to be able to use a technology easily, some of the participants only mentioned that a technology should work well without any technical problems that may cause unnecessary frustration. For example, one instructor chose not to use a lot of technology in class because technical difficulties could be stressful and could negatively affect the class. This instructor, i4B, explained:

> That it's working without problems. That is one of my main factors. That is also why I don't use very much in class because when I look at presentations, I've seen so many things go wrong and then it's such a poor class because the teacher is completely stressed out because the technology doesn't work.

Like i4B, a language coordinator also felt that a technology must be reliable because of the limited time in class to fix technical problems. This language coordinator, c3B, elaborated in the excerpt below that technical reliability was a very important factor for technology adoption.

> **Interviewer:** Are there any other factors that will influence you?
>
> **Coordinator**: Yeah, knowing that it [technology] is going to be there when I want it to turn on. Fifty-minute classes are short. You have to pack in so much. To spend five or ten minutes attempting to get the technology to work is not good.

These examples show that a technology should be user-friendly both with respect to being easy to use, but to also work smoothly without any technical problems.

While this factor was mentioned as important for a number of participants, others indicated that hearing that their colleagues have had success with a particular technology encouraged them to use it. This factor and its importance to this study are discussed in the next section.

6.3 The Influence of Hearing that a Technology Works for Others

Hearing that a particular technology was used successfully by others is a central factor to this study as it relates to the data analysis and discussion in the previous chapter that focused on the types of technology-related conversation the participants had with their colleagues. Chapter Five concluded that all the participants, except for three, regardless of how much technology they used, either had technology-related conversations at the time this study was conducted or had such discussions in the past with colleagues inside or outside of their departments. However, it was not clear if the conversations had actually influenced the instructors to adopt a particular technology. Therefore, content analysis, focusing specifically on the factors that the participants indicated as influencing their technology adoption decisions, fills the gap that the results in the previous chapter could not address.

One of these factors, as Figure 11 shows, is represented by the code "successfully used by others". Nine participants (two in Department A and seven in Department C) indicated in their interviews that hearing a colleague has used a technology with some success influenced them to try using the technology as well.

One instructor in Department A shared that hearing a colleague used blogs successfully had encouraged the instructor to use them. This instructor, i2A, explained:

> I gained an appreciation for blogging through co-teaching a course with i8A. I would never have really understood why it's an effective tool without doing this course with him. I've always tried to avoid you know, Facebook and blogging and Twitter because I'm just worried about the time that it'll take up, but I see it's a very interesting tool for teaching.

Similar to i2A, another instructor in Department A also became encouraged to try a new technology after hearing a colleague had used it successfully. This instructor, i4A, mentioned: "I do know that i8A, for example, uses Wikipedia and I've been playing with the idea for my own course for the last few weeks". Both instructors, i2A and i4A, were encouraged to consider using a technology, blogs and wikis respectively, after hearing that their colleague, i8A, had success with it. Similarly, instructors in Department C had also been influenced to try a technology after hearing others had used it. As one instructor, i11C, described in the excerpt below, hearing from colleagues that a technology was effective, encouraged the instructor to consider adopting it.

> **Interviewer:** What is it that influences your decision to use it [technology] or not to use it?
>
> **Instructor:** It's how effective and how useful, because for me it's not the main tool or main means. Classroom activity that's the main approach so,

> it's something that will assist student learning. So, how effective and how useful it is for students.
>
> **Interviewer**: And how do you usually find out how effective or useful it is?
>
> **Instructor:** I'm not the first one to try it, so from others.

Likewise, a language coordinator in Department C also expressed that learning how others used technology helped the coordinator be aware of the technologies available. As the coordinator, c7C, stated: "[s]eeing what other colleagues are doing really helps otherwise you don't know what is happening, you know, with technology". Similarly, another language coordinator in the same department further elaborated that hearing about technology from colleagues was the second most influencing factor after knowing that the university supported the technology. This coordinator, c6C, described the most influential factors for technology adoption in the excerpt below.

> **Interviewer**: What would you say are the major factors when you're deciding which technology to use? What influences you to use those particular technologies?
>
> **Coordinator**: Well first of all, of course, if they [administrators] say, *oh this is good we organize these workshops for you, come*. Of course, that's the major reason. But then, I think from colleagues. For example, I talked to c7C and I learned about Hot Potato from c7C and I go to conferences. I talk with my colleagues. I get my information and I say, *oh this seems to be good.* And also online, you know, people from other universities. There is a

very good instructor who is really into this kind of thing and would always send us information.

Interviewer: So hearing that it works for other people?

Coordinator: Right.

While this coordinator identified training opportunities at the university as the most important factor for adopting a technology, the second most important factor was hearing from colleagues, inside and outside of the department, that a particular technology was beneficial for teaching and learning. Hence, technology-related conversations with colleagues were essential for this coordinator to adopt new technologies.

The examples show that hearing that colleagues had success with a particular technology influenced some instructors and coordinators to consider adopting a technology. Although the previous chapter concluded that 20 participants had technology-related discussions when this study was conducted or had had such conversations in the past, only nine participants expressed in their interviews that such conversations directly affected their decision to choose to use a particular technology. Furthermore, none of the nine participants were from Department B, which is probably because coordinators set up many of the courses in this department and instructors, therefore, had less flexibility in selecting the technologies they used as discussed previously in Chapter Four. In addition, while the instructors in Department B had an opportunity once a term to discuss technologies with their colleagues, these discussions were focused on collectively

deciding which tools to use, as discussed in the previous chapter. Hence, it seems likely that instructors in this department did not mention that they selected to use a particular technology based on whether it works for others since, for the most part, they were using the same tools. The previous section reported the most commonly mentioned factors essential for technology adoption for the study participants and this section focused on the effect of hearing that other instructors had successfully used a particular technology. However, the study discovered some other factors that, although mentioned less frequently than the ones already reported, were important for some of the participants. These factors are discussed together in the following section.

6.4 Other Factors Influencing Technology Adoption

Other than the five most commonly mentioned factors influencing technology adoption discussed above, there were eight other factors that the participants mentioned as instrumental in deciding which technologies to use.

Six participants indicated in their interviews that they had chosen to use a particular technology because they felt it was a necessity. As one coordinator, c1A described: "[t]here's no way out of it. When everybody has electricity you're not going to go back and go around with a candle or go in a horse and buggy when everybody else has a car". In comparing technology to the introduction of electricity and the car, this coordinator indicated that in the current era it was necessary to use the technology available in order to remain up to date. Like this coordinator, some instructors felt that, in order to stay current, they had to use technology. For example, one instructor, i5B, explained: "[b]ecause, I really want

to be on top, right? I don't want to be a dinosaur because otherwise the students are not going to take you seriously. I can see that." Other instructors shared the same sentiment. As i2B contributed: "[y]ou know, we are in the 21st century, we have to do it" and i10C mentioned: "I think to keep updated with technology is very important and it's unavoidable in modern life". Hence, a factor that influenced some instructors to use a technology was the need to remain current and the belief that technology was a necessary addition to their teaching practice.

The next commonly expressed factor influencing technology adoption was its capacity to free up class time for other activities. Five instructors indicated that they chose to use a certain technology because they had limited time in class and the technology allowed students to do activities at home, thereby freeing up class time for instruction or other exercises. For example, one instructor explained that learning a language takes much more time than the class time would allow and therefore, with technology, the students could practise their skills at home. This instructor, i4A, clarified:

> Learning a language involves different skills, so I know that in my three hours per week I'm providing a minute part of what they really need to develop some competency and knowledge and some proficiency. So I look at technology as that tool, as that element that can supplement the class time.

Since there is limited classroom time, i4A asked students to use educational technology to improve their language skills in their own time. Similarly, a

language coordinator asked students to use the Wimba Voice Board, an asynchronous audio discussion board, to practise their language speaking skills at home. The coordinator, c6C, described this as follows: "[i]n class there is so limited time so we can't really ask every student to say something, you know, fifteen minutes, how many minutes will one student get? So, it is good to use that [Wimba]". These two examples show, that due to limited class time, instructors asked students to use technologies outside of class to supplement the activities they did in class.

Another factor, mentioned by three participants, was whether students specifically requested that the instructor used a particular technology, as represented by the code "students' request". As one instructor, i2B, contributed: "[s]tudents will come to you and ask *can I find this or that online and can you send me the link* so you have to be able to communicate and be able to use all these new tools". Three other participants indicated that an important factor was if the technology was designed to allow interaction. As one instructor, i5C, mentioned: "[i]f you have a technology that allows interaction you can add to the students' learning experience really quickly. Once you have it set up, you can add a lot to their experience without a huge effort".

Alternatively, two participants indicated that a factor that influenced their selection was the novelty of the technology, as they found it exciting to learn about new tools. For example, one instructor, i2C, explained: "[a]nother factor is it [technology] is so exciting. It's very exciting sometimes". While an exciting technology was an important factor for two instructors, two coordinators

mentioned that having training available on how to use a technology was one of the factors that influenced their decision to use it. For example, one language coordinator, c6C, acknowledged: "[i]f they [administrators] say *oh this is good. We organize these workshops for you, come*. Of course, that's the major factor". In addition, two instructors explained that having financial support to build educational materials using technology encouraged them to use a particular tool. As one instructor, i3A, for example mentioned: "I received funds in order to add an online component to a course. So that is encouragement". Furthermore, two participants stressed that a technology being open-source and customizable was a very important factor for them. As one instructor, i2A, elaborated:

> Everything I want to use should be open source and I would like for it to be so. Well, first, *is it open source*? Then I start saying, *well how programmable is it? How easily is it possible to modify it and tailor it?*

While the factors reported in this section were considered to be important for two or more participants in this study, one participant indicated that a critical factor was whether the technology supported multiple language fonts. This instructor, i4C, specified: "[p]articularly in my field, the ability to easily create material in multiple languages and scripts". According to this instructor, for languages that use keyboards that are different from the standard English keyboard, the technology should be able to support various language fonts and scripts.

6.5 Summary

This chapter reported the various factors that the study participants

considered important in their decision to choose to use an educational technology. The beginning of the chapter focused on the five most commonly mentioned factors: easy access to information, enhancing students' learning experience, lessening instructors' workload, being user-friendly, and successfully being used by others. This last factor is of particular interest as it emphasizes the fact that nine participants felt that conversations with their colleagues influenced their technology adoption. The previous chapter concluded that the majority of the participants either had technology-related conversations at the time this study was conducted or had had such discussions in the past. However, whether these conversations were influential for technology adoption remained unknown. Hence, the results presented in this chapter show that almost half of the participants who discussed educational technology with colleagues, felt that such discussions influenced their adoption decisions. The remainder of this chapter reported on the other factors that the participants shared in their interviews as being critical for adopting technology. While these factors were considered important for less than seven participants, they show that there were a wide variety of factors that influenced the study participants to adopt technology. The following chapter discusses how the results of this study relate to previous literature and to what extent, if any, the results can explain the technologies that foreign language instructors choose to adopt.

Chapter Seven: Discussion

The findings of this study have been presented and analyzed in the previous three chapters (chapters 4-6), providing data and insights into the questions posed in the first three research questions. The results of the analysis are summarized, in turn, in the following sections and compared to relevant earlier studies mentioned in *Chapter 2: Literature Review.* Relating the results of this study to previous studies will show whether these results complement the conclusions of previous studies or alternatively, whether they reveal other factors that influence technology adoption. The chapter will continue with a discussion of factors emerging from this study, which may help explain the technology adoption decisions of foreign language instructors. This discussion chapter will address the final research question in this study, namely:

iv) To what extent and in what ways can the factors determined in questions two (referring to the impact of communication with colleagues or social networks on technology adoption decisions) and three (referring to all factors mentioned by participants influencing their technology adoption) be used to predict an instructor's decision whether to accept or reject a new technology?

7.1 The Use of WebCT Vista and Social Networks

Chapter Four began by reporting to what extent the participants actively used the learning management system (LMS), WebCT Vista. The results showed that all, except for one participant, used WebCT Vista. While some participants

used it minimally, others used it more extensively. According to the results, most participants used the LMS for uploading notes or for providing web links to additional resources. This parallels the results from previous studies where online technologies were primarily used for providing students access to assignments, readings, lecture material, or links to external websites (Arnold, 2007; Dutton, Cheong, & Park, 2004). However, some participants in this study also used the asynchronous discussion board that, according to the literature, allows students to practise their writing and reading skills outside of class time (Cho & Carey, 2001). After reporting on the observational data of how the participants used WebCT Vista, Chapter Four provided a list of all the other technologies the participants indicated in their interviews that they used for teaching and learning purposes. These technologies covered a wide variety, including PowerPoint, blogs, digital media, wikis, and vocabulary games. This relates back to the literature that says that there is a growing number of educational technologies emerging that are useful for foreign language teaching and learning (Cho & Carey, 2001; Kabata et al., 2005; Wang et al., 2010). For example, two participants in this study shared that they asked students to use blogs, which supports previous literature on blogs and how they can provide an opportunity for students to practise their writing skills through sharing opinions and reflective practice (Levy, 2010). The descriptive analysis of the tools within WebCT Vista and the various other educational technologies that the participants mentioned that they used, established which instructors used a greater number of technologies and which used a lesser number. This background information was important for

the social network analysis reported in the second half of the chapter, as the purpose of this analysis was to begin to answer the second research question of this study which asked,

> ii) In what ways does communication with colleagues about educational technology, or their professional social networks, affect foreign language instructors' technology adoption decisions?

Previous studies had shown that conversations among colleagues influences instructors' decisions to adopt a particular technology or to modify a teaching strategy. In her dissertation, Mwaura (2003) explored factors that influence faculty members of a variety of disciplines to adopt technology. Of the 31 participants in Mwaura's study, 26 collaborated with colleagues and received some mentorship. Similarly, Davis' (2005) technology adoption study in one foreign language department showed that collaboration amongst faculty, graduate students, and programmers helped with the success of the overall adoption in the department. Likewise, studies on communities of practice have shown that individuals who value interaction and collaboration, meet together to discuss new strategies or to learn from one another (Lave & Wenger, 1991; Wenger et al., 2002). Hence, this study investigated whether the social networks of foreign language instructors or the conversations they have with colleagues influences their technology adoption.

As reported in Chapter Four, social network analysis revealed a pattern emerging in two of the departments showing that instructors who used a greater

number of technologies tended to have greater betweenness centrality and act as an intermediary, assisting with the flow of information between instructors in a departmental network. This resonates with Burt's (1992) notion that certain members of a social network act as intermediaries or brokers of information, filling the structural holes or gaps in a network. The instructors in this study who were in an intermediary position in their departmental social networks tended to be in positions of influence in their departments, since they helped spread information to instructors who would otherwise not hear about new technologies. This trend supports the results of previous studies concluding that collaboration and communication with colleagues plays a role in influencing technology adoption (Davis, 2005; Mwaura, 2003). It also follows the results of studies on social networks that further show that conversations with colleagues can influence instructors' pedagogical decisions (Roxa & Martensson, 2009). The emerging pattern in Departments A and B provides some insight for senior higher education administrators who are hoping to identify the key instructors who can help promote technology adoption to the rest of the instructors in their academic departments (Kopcha, 2010). Following the trend emerging from this study, senior higher education administrators can identify the instructors who have adopted a greater number of technologies and enlist their support for spreading information about various technologies to their colleagues (Roberts, 2008). However, social network analysis of the third department did not show an emerging pattern or relationship between the number of technologies the participants had adopted and their betweenness centrality or position in their

departmental network. Therefore, in order to better understand the types of conversation instructors had with one another and the potential role, if any, that they had on technology adoption, content analysis of interviews with the participants was presented and discussed, as summarized in the following section.

7.2 Conversations about Educational Technology

Results from the content analysis of the portions of the interview transcripts referring to the participants' technology-related discussions with their colleagues was reported in this study in Chapter Five. Content analysis explained the types of conversation that the participants had about technology with colleagues within or outside of their departments. This interview data does not change the fact that social network analysis had revealed an emerging pattern in two of the three departments. However, it does provide additional information about the technology-related conversations that the participants had with their colleagues.

The following table summarizes the types of conversation the participants had about educational technology, as reported in Chapter Five of this study. For those who did not initiate any conversations about technology or who only had conversations with one other colleague, information about the types of discussion, if any, they had prior to using WebCT Vista is also included to explain whether they had technology-related discussions in the past or if their colleagues introduced them to the LMS.

Table 6

Types of Technology-Related Discussion

# of instructors	Department	Types of technology-related discussion
7	Mix of departments	Discussed with a few colleagues • Three had conversations with instructors at other educational institutions
4	Department C	Did not initiate conversations and did not learn about the LMS from colleagues • One had conversations with international colleagues prior to using WebCT • Three did not have any discussions in the past nor were introduced to WebCT by colleagues
4	Department C (except 4th one from Department A)	Discussed with one colleague • One had conversations with instructors in other departments prior to using WebCT • One gave technical advice to colleagues prior to using WebCT • One was introduced to WebCT by colleagues • One had discussions with the educational technology specialist in the department
2	Department C	Discussed with colleagues at workshops (and with one or two colleagues) • One discussed with colleagues at international events as well • Both were introduced to WebCT by colleagues
3	Department B	Discussed with colleagues who taught the same course once a term
1	Department A	Discussed with instructors in other departments • Also had conversations with colleagues about using language labs prior to using WebCT
1	Department B	Discussed with instructors at other places only

Table 6 summarizes the information that all but one of the participants provided regarding the types of conversation they had with their colleagues about educational technology. As mentioned previously in Chapter Five of this study, one participant chose not to answer questions regarding conversations with colleagues or professional social networks.

As Table 6 shows, many instructors had discussions about technology with at least one colleague. Seven participants had technology-related conversations with a few colleagues, three had discussions once a term with others who teach the same course, one had conversations with language instructors in other departments, and another had such discussions with instructors in other educational institutions. Meanwhile, four participants indicated that they only discussed technology with one other colleague. However, three of them had such discussions with more colleagues in the past, prior to using WebCT. In addition, two participants who only spoke with one or two colleagues in their department, shared in their interviews that they had many discussions when they attended departmental or international workshops. Finally, four participants from Department C, did not initiate any conversations about technology with their colleagues, although one of them mentioned having technology-related discussions with international colleagues prior to using WebCT Vista. The three others, as represented by the yellow highlighted text in Table 6, stated in their interviews, as reported in Chapter Five, that they did not initiate any

conversations about technology with their colleagues, nor did they have such conversations prior to using WebCT.

Results from the interviews showed that most foreign language instructors had discussions with others about technology but that these conversations were not restricted to colleagues within their academic department. Since social network analysis was limited to information regarding the ties between the participants and their colleagues within their departments, in-depth interviews provided more information about the types of conversation the participants had with one another about technology. Interview data showed that conversations could occur during workshops, international events, and with instructors in other departments or at other educational institutions. Furthermore, at various times in their academic careers, instructors had greater or fewer conversations, depending on the opportunities they had at the time to discuss technology with colleagues, or whether they felt at the time that they would learn from sharing ideas with others. These results support previous studies that had concluded that instructors discuss and share ideas about educational technologies with colleagues (Davis, 2005; Kessler & Plakans, 2008; Mwaura, 2003). However, it is not yet clear whether the instructors felt that such conversations influenced their decisions to use a particular technology, or if there were other critical factors involved. Hence, further content analysis of the interview transcripts, focusing on the factors that influenced the participants to adopt technology was presented and analyzed, as summarized and discussed in the following section.

7.3 Factors that Influence Technology Adoption

Chapter Six of this study reported on 17 different factors that the participants indicated in their interviews as being important for selecting a technology for teaching and learning purposes and specifically answered the third research question:

> iii) According to foreign language instructors, what are the factors that influence their adoption of a learning management system, such as WebCT Vista, or other educational technologies?

This section summarizes the seven most frequently mentioned factors and compares them to previous studies. In particular, it discusses how the results from this study support Davis' (1986) Technology Acceptance Model (TAM) as being most influential in determining technology adoption. The most common factor, according to 18 participants, was the potential of a technology to provide students with easy access to information. One such technology is WebCT Vista, as it provides an online environment for instructors to share resources with their students (Kabata et al., 2005; Siekmann, 1998). This supports the results from Arnold's (2007) study that showed the majority of foreign language instructors used a technology because of its convenience for students. This particular factor is very similar to one of the primary factors in Davis' TAM: *perceived usefulness*, as discussed in Chapter Two. Perceived usefulness refers to individuals feeling that technology is able to enhance their job performance or allow them to do their job more easily (Davis, 1989; Davis et al., 1989). According to the majority of the study participants, a technology was considered or perceived to be useful if it

allowed the instructors to share course information with students in a convenient and accessible format. Hence, the most commonly mentioned factor in this study, easy access to information, fits well with Davis' TAM. The second most commonly named factor, as mentioned by 13 participants, referred to a technology having the functionality to enhance the learning experience much like the results reported in Lam's (2000) study with foreign language instructors. This factor, along with the previous one, again relates to the *perceived usefulness* criterion of Davis' TAM since the participants considered a technology to be useful if it had the capacity to facilitate activities related to the learning objectives of the course or enhanced student engagement. The third frequently mentioned factor, acknowledged by ten participants, was the capacity of a technology to reduce the workload of the instructors. This requirement derives from the desire some instructors had to reduce their printing or photocopying costs, eliminate the organization involved for making photocopies, carry less material to class, and administer quizzes and self-tests more easily. In essence, again, this factor is similar to Davis's *perceived usefulness* criterion as the participants perceived a technology to be useful if it minimized their administrative workload. It also fits with the results of previous studies, which showed that some faculty members chose to use a web-based technology because of a reduction of the administration and expense of photocopied materials (Chen, 2008; Mwaura, 2003).

The fourth commonly mentioned factor, stated by nine participants, was a technology being successfully used by other instructors. This particular criterion represents how instructors felt that the conversations they had with their

colleagues about technology, as discussed in the previous section, affected their decisions about technology adoption. The previous section discussed the fact that all participants, except for three, had at some point in their teaching careers discussed technology with colleagues. Therefore, just under half of the participants who had technology-related conversations, felt that such discussions influenced their decisions to use a particular technology. Although this was not the most commonly mentioned factor for technology-adoption, it was important for almost half of the participants who had technology-related conversations. This finding corresponds with previous studies that have also shown that collaboration with colleagues and discussions about technology are instrumental for successful technology adoption (Davis, 2005; Foulger & Williams, 2007; Kessler & Plakans, 2008; Mwaura, 2003).

As presented in the previous chapter, eight participants indicated that they would consider adopting a technology if it was user-friendly. This relates to TAM's second factor, *perceived ease of use* which refers to how much perceived effort is required to use a particular technology. For these eight particular participants, the technologies they chose to use required minimal effort.

The seven factors summarized and related to previous research in this section were mentioned most often by participants in this study and, together with the results discussed in sections 7.1 and 7.2, help determine the factors regarded by foreign language instructors as being necessary for their technology adoption. The next section discusses the most critical factors arising from this study and

how they may help explain and predict technology adoption amongst foreign language instructors.

7.4 Predicting Technology Adoption

The final research question of this study focused on determining the factors, if any, that could help predict technology adoption. The question specifically investigated,

> iv) To what extent and in what ways can the factors determined in questions two and three be used to predict an instructor's decision whether to accept or reject a new technology?

As the summary and the discussion of the social network analysis in Section 7.1 shows, a trend emerged in two of the three academic departments in this study. The partial social networks of Departments A and B illustrated that the participants who used the greatest number of technologies also tended to have higher betweenness centrality or, in other words, were in an intermediary position helping spread information across the department network. However, the social network analysis of Department C did not show a trend or relationship between the number of technologies the instructors had adopted and their betweenness centralities. Since social network analysis did not discover a similar trend across all three departments, the results are not transferable and, therefore, are not useable to predict technology adoption. Content analysis of the interview transcripts, therefore, provided more information to better understand the types of

conversation the participants had with their colleagues about educational technology.

As discussed in Section 7.2, all but one of the participants explained in their interviews about the types of technology-related conversation they had with their colleagues. Content analysis revealed that 19 out of 22 participants discussed educational technology with colleagues. Three participants, however, specified that they did not initiate conversations about technology with their colleagues nor had they done so prior to using WebCT Vista. Two of these particular participants mentioned in their interviews that they preferred to have discussions with educational technologists at the local technology support unit. Furthermore, one participant expressed preference for learning independently without consulting others. Since, the majority of the participants indicated having technology-related discussions, it is apparent that foreign language instructors at this particular educational institution preferred to discuss educational technology with each other. However, since this general trend does not differentiate between participants who used a greater number of technologies and those who used a lower number, it cannot help to predict when an instructor would choose to adopt a technology. Further content analysis on factors that the participants specifically noted in their interviews as influencing their adoption decisions helps to determine if any predictable factors have emerged from this study.

Although TAM had already been established as a being useful for predicting technology acceptance (Venkatesh & Davis, 2000), the results of this study further support this by determining that the two essential factors of this

model, perceived usefulness and ease of use, can also help predict the technology adoption of foreign language instructors. As discussed in Section 7.3, three frequently mentioned factors in this study are very similar to the *perceived usefulness* criterion of TAM's: easy access to information, enhancing the learning experience, and lessening the workload of instructors. In addition, one factor discovered in this study, a technology considered to be user-friendly, is consistent with the *perceived ease of use* requirement of TAM. However, as mentioned in Chapter Two, perceived usefulness is significantly more important for technology adoption than perceived ease of use (Davis, 1989; Davis et al., 1989). The results in this study are consistent with perceived usefulness being the primary determinant of technology use, since a number of participants indicated, through three similar factors, that a technology must be useful for them. User-friendliness or perceived ease of use, on the other hand, was considered to be a secondary factor influencing technology selection for the participants in this study, just as with TAM. Therefore, this study concludes that TAM can be used to help predict the technology adoption of foreign language instructors at the particular educational institution where the study took place.

One other factor, hearing that a technology has successfully worked for other instructors, was mentioned by just under half of all the participants who reported in their interviews that they had technology-related conversations with their colleagues. As discussed in Section 7.3, out of 19 participants who, at some point in time, had discussions about technology with others, nine acknowledged in their interview that hearing their colleagues had successfully used a particular

technology encouraged them to use it as well. This somewhat supports other studies that have previously determined that collaboration with colleagues is necessary for technology adoption (Davis, 2005; Foulger & Williams, 2007; Kessler & Plakans, 2008; Mwaura, 2003). However, since this factor was mentioned by less than half of the participants, it cannot be generalized or be used to predict technology adoption. It does, however, show that not only did many of the study participants have discussions with colleagues about technology but, for almost half of them, such discussions directly affected their technology adoption decisions.

7.5 Summary

This chapter summarized the results from the descriptive analysis of the observational data, social network analysis of the pre-interview questionnaire data, and content analysis of the interview data and discussed how they related to previous literature. The focus of the chapter was to answer the final research question, which explored the factors that could be used to predict the technology adoption of foreign language instructors. The study results are consistent with Davis' (1989) Technology Acceptance Model (TAM), with *perceived usefulness* as a primary factor for technology adoption and *perceived ease of use* as a secondary requirement (Davis, 1989; Davis et al., 1989), based on the factors mentioned by the participants as influencing their technology adoption. In particular, three factors commonly mentioned by many participants in the study supported the *perceived usefulness* criterion of TAM as being essential for predicting their technology adoption decisions. Likewise, not as many participants

indicated that perceived ease of use or user-friendliness was important for their technology selection, another point consistent with TAM. Therefore, according to the results of this study, TAM is applicable for predicting technology adoption amongst foreign language instructors at the educational institution where this study took place. In addition, the chapter concluded that hearing that others had success with a technology cannot help predict technology adoption, since less than half of the participants indicated that this was an important factor for them. However, this does show that conversations about technology, although not a factor in prediction, influenced some foreign language instructors to use a particular technology. The following chapter will discuss the significance of the study results for the community, the delimitations of the study design, the limitations encountered, and will offer suggestions for future research.

Chapter Eight: Summary, Conclusions, and Future Directions

This final chapter begins with an overview of the important role of educational technology in foreign language instruction followed by a summary of the results of this study. It will continue with a discussion of the delimitations of the study design and the limitations encountered and will offer suggestions for future studies that can further explore technology adoption amongst post-secondary instructors. The significance of this particular study for the higher education community and its contribution to the scholarship of technology adoption and foreign language instruction is discussed at the end of this chapter.

Educational technology in the foreign language classroom can have its merits, as demonstrated by various studies discussed in *Chapter Two: Literature Review.* Communication technologies, in particular, can help students practise their oral, written, and listening skills with one another through asynchronous discussion boards and audio boards (Cho & Carey, 2001; Kabata et al., 2005). Finally, other technologies, such as interactive white boards, help motivate students to pay attention and be focused in class (Gray et al., 2007). In general, today's technologies are helping students to not only practise the language they are learning but they also bring greater affordances, such as increased engagement and flexibility (Chen, Lambert, & Guidry, 2010). This is one of the reasons that senior higher education administrators are looking for ways to successfully implement wide-spread technology adoption in their institutions (Abrahams, 2010). This study, therefore, explored the factors that influence instructors to adopt technology.

Previous adoption models have indicated that technology acceptance is based on two factors: *perceived usefulness* and *perceived ease of use* (Davis et al., 1989). Furthermore, earlier studies have shown that, for language instructors, collaboration amongst colleagues is necessary for the success of technology adoption (Kessler & Plakans, 2008) and that instructors tend to have teaching-related conversations with others in their professional social networks within their academic departments (Niesz, 2007; Roxa & Martensson, 2009). However, previous studies have not specifically investigated the social networks of post-secondary instructors or the conversations they have with their colleagues to determine the role of social networks on instructors' technology decisions. This study, therefore, addressed this particular gap and explored the factors that the instructors considered to be most critical for their technology adoption.

8.1 Summary of the Study

As described in *Chapter Three: Methods*, this case study, situated in social network theory, used a combination of observational, pre-interview questionnaire, and interview data for content and social network analysis. The study specifically investigated the technologies that the foreign language instructors in one post-secondary institution used for teaching purposes, trends across the social networks of the three academic departments, and the factors that foreign language instructors considered to be most influential for technology adoption.

Chapter Four: The Use of WebCT Vista and Social Networks reported the results pertaining to which tools within the learning management system, WebCT Vista, the participants used most frequently and which other technologies they

had selected to integrate with their on-campus instruction. The results showed that, while foreign language instructors used a variety of educational technologies, they mostly used WebCT Vista for posting files for their students. Furthermore, these results helped determine the total number of technologies each participant had adopted for teaching purposes. Knowing which participants used greater or fewer technologies was important for the social network analysis that was discussed in the second half of this initial results chapter. Participants noted in a pre-interview questionnaire the colleagues with whom they spoke about technology in their departments. The information provided was confirmed in the interviews and was represented visually using a social network analysis and visualization software application, Gephi. Sociograms of the partial social networks of each academic department (Haythornthwaite, 1996; Scott, 2007) were created and analyzed for any emerging patterns. However, as reported in Chapter Four, a pattern emerged in two of the three departments. Social network analysis of two departments showed that those who used a greater number of technologies had greater betweenness centrality or, in other words, were in a position of influence assisting with the spread information about technology across the department. These individuals were filling the structural holes between members of the social networks by acting as brokers of information (Burt, 1992) helping information to travel to instructors on opposite sides of their departmental social network. Social network analysis of the third department, however, did not reveal any significant pattern concerning the influence of certain instructors on the flow of information and the number of technologies they had adopted.

Content analysis of the interview data using the qualitative analysis software, Atlas.ti, reported in *Chapter Five: Conversations about Educational Technology* did not change the results of the social network analysis but, instead, provided additional information about the participants' technology-related conversations. The results revealed that all the participants, except for three, had technology-related discussions with colleagues within or outside of their departments at some point during their teaching careers. However, since the majority of the participants, regardless of how much technology they used, had at some point in time had technology-related discussions with colleagues, the content analysis could not determine if such conversations influenced their technology adoption. Hence, *Chapter Six: Factors that Influence Technology Adoption* reported the specific factors that the participants acknowledged in their interviews as influencing their decision to use a particular educational technology. The results showed that 17 different factors were mentioned as influencing participants' decisions. However, the most commonly stated factor (supported by 18 participants) was the capability for a technology to provide students with easy access to information. Following this requirement, other frequently mentioned factors were a technology having the capacity to enhance the learning experience by helping students meet the learning objectives of their course, to lessen instructors' workload, and to be user-friendly. In addition, while the study showed that the majority of the participants had conversations about technology with others, just under half of them indicated in their interviews that these discussions directly influenced their technology adoption.

Chapter Seven: Discussion summarized the results from the data collection and analysis and related these to relevant previous research in order to determine if the results could help predict the technology adoption decisions of the foreign language instructors in this case study. Since the social network analysis had not presented a consistent trend across all three academic departments and the interview data showed that less than half of the participants felt technology-related discussions with colleagues influenced their adoption, neither social networks nor conversations about technology seem to have the capacity to help predict the technology adoption decisions of the instructors. However, many of the participants in this study mentioned that they considered the following three factors to be important for their technology adoption:

1. The technology should facilitate easy access to information.
2. The technology should enhance the learning experience by allowing instructors to design activities that increase student engagement or help meet the learning objectives of the course.
3. The technology should lessen the workload of the instructors by reducing administrative tasks.

These three factors closely resemble the *perceived usefulness* criterion of the Technology Acceptance Model (TAM) (Davis, 1986) as they refer to instructors selecting to use a technology if they perceived it to be effective for sharing information with students, enhancing the learning experience, or reducing their administrative tasks. In addition, eight participants stated that a technology would need to be user-friendly, supporting the *perceived ease of use* requirement of

Davis' TAM. Therefore, the results of this study are consistent with TAM (Davis, 1986) and reveal that this model can be used to help predict the technology adoption of foreign language instructors in this case study. The next section discusses the significance of the results of this study to the community.

8.2 Significance of the Study

Due to the great affordances that educational technology can bring for engaging students and providing greater flexibility (Chen et al., 2010), senior higher education administrators are increasingly including educational technology as part of their core policies (Conole, 2010). However, some instructors continue to resist the integration of technology with their teaching (Roberts, 2008). Senior administration, therefore, are faced with the challenge of implementing strategies to best facilitate technology adoption across their campuses. Thus, the purpose of this study was to investigate the factors that influence instructors to adopt technology. In particular, this study explored whether patterns in instructors' social networks could show the influence of technology-related conversations with colleagues or if there were other factors that could predict technology adoption. As mentioned at the beginning of this chapter, previous studies have shown technology to be useful for language instruction and learning in particular (Cho & Carey, 2001; Gray et al, 2007; Kabata et al., 2005; Siekmann, 1998). Yet, some language instructors continue to avoid using the technology available. Hence, this study focused on investigating the factors that influence foreign language instructors, specifically, to adopt technology. Identifying the factors that are most important for this group of instructors can help senior higher education

administrators to determine the strategies that can successfully promote technology acceptance and increase its use across their campus. Since the results of this study conclude that Davis' TAM can be used to explain when instructors would choose to use a particular technology, the senior administration at the particular institution where this case study took place could refer to this model when selecting technologies to purchase or develop. Using Davis' TAM to help predict technology adoption among instructors can be a cost-effective way for educational institutions to short-list potential technologies (Gao, 2005) that could replace current ones when they reach the end of their licence agreements or are no longer technically supported. In particular, taking this approach could help the senior administration to determine if the instructors would perceive a technology to be useful, and therefore, choose to use it. Since this study only investigated the perceptions of participants from one particular educational institution and focused solely on foreign language instructors, the results cannot readily be applied or generalized to a broader population of instructors. The following section discusses these delimitations and other limitations and offers suggestions for future studies.

8.3 Delimitations, Limitations, and Future Research

As noted above and discussed in Chapter Three, the participants in this study were specifically foreign language instructors in one post-secondary institution, a delimitation of the study design. There were several delimitations and limitations in this study deriving from the number of participants, the case study nature, the cultural background of the departments, and the scope and intent

of this study. These are discussed in detail below with suggestions for future research.

Due to such a small group of participants in a restricted area and the necessarily limited scope of this study, the qualitative findings from this study cannot be generalized to a broader community of instructors. Future studies could involve participants from other educational institutions in order to conduct a cross-comparison and be able to apply the results more broadly. Such studies could focus specifically on foreign language instructors in other educational institutions, to determine if parallels could be drawn between the results from those institutions and this study.

A second delimitation is related to the case study nature of the study and the limited population sample. Future studies with a greater number of participants could provide opportunities for quantitative data collection and analysis, such as the use of a survey to statistically determine whether perceived usefulness and perceived ease of use are factors that influence instructors' actual technology adoption. Due to the limited scope of this case study, the qualitative findings were based on the factors that the participants personally considered most important for their technology adoption decisions.

A third delimitation of this study is the participant sample consisting of participants from only one academic discipline. As discussed in Chapter Two, previous technology adoption studies with instructors from different academic disciplines have been conducted. However, since this study was primarily

designed to investigate technology adoption amongst foreign language instructors, a subject area that has extensively used educational technology for decades (Salaberry, 2001), the results cannot be applied to other disciplines. Hence, future research could expand the sample to include instructors who teach other subject areas, which historically have not typically used educational technologies, to determine if the culture of the academic discipline or historical support for technology adoption impacts the findings or reveals further information regarding the influence of conversations amongst instructors on technology adoption decision.

A fourth delimitation of the study is related to the scope and intent of the research questions. Since this study focused on the face-to-face conversations between participants, primarily in their academic department, data on other types of conversations or social networks was limited. Future studies could expand the research questions to include an investigation of the influence of electronic conversations through social network software or e-mail technology adoption decisions and specifically collect data on the types of conversation instructors have with colleagues in other departments or institutions. In addition, the first research question of this study investigated how actively the foreign language instructors used WebCT Vista and interview data further revealed the other types of technology the participants indicated that they used for teaching purposes. However, the intent of the study was to determine the total number and variety of technologies the participants used, rather than exploring how they used the technologies or the extent of their use of these. Hence, some of the technologies

mentioned in the interviews may have had multiple features allowing them to be repurposed for various purposes. Due to the design of the study questions and the guiding interviews questions, data on how technologies were used or repurposed was not collected. Future studies should therefore strive to collect data on how instructors use the available technologies including whether they repurpose technologies for various tasks and the extent of their use.

While this study had four delimitations due to the study design and intent, five limitations were encountered. The first limitation refers to the response rate. As mentioned in Chapter Four, 75 language instructors across three academic departments were invited to participate in the study. Despite a 31% response rate, the participants did not proportionately represent instructors in the three departments. For instance, the proportion of participants from Department A was considerably lower than the proportion of participants from the other two departments. Hence, the data from Department A may not accurately represent the behaviors and views of all the language instructors in this department. While the relative number of participants from the other two departments was higher, it was still less than 50% of the total number of instructors in the departments. Therefore, although the data from departments B and C are more representative of the language instructors in these two departments, they may not apply to all the instructors in these departments.

The second limitation encountered in this study was the lack of participants that did not use educational technology, such as WebCT Vista. While both instructors who were actively using WebCT Vista and those who were using

other teaching strategies were invited to participate in this study, all but one of the participants actively used the learning management system. In addition, the one instructor who did not use WebCT Vista, used other learning management systems available through textbook publishers. Therefore, this study could not compare the social networks or conversations of technology-adopting instructors with those who use other approaches in order to discover any differences that could help explain factors that influence instructors to use technology.

The third limitation was due to the different strategies of technology use in the three departments, as revealed by the interviews with the language coordinators. Compared to instructors in departments A and B who used WebCT Vista sites designed by the language coordinators, the instructors in Department C had more flexibility in selecting which technologies they used. This range in flexibility and difference in overall approach to WebCT Vista may have affected the types of conversation occurring in the department and findings from the social network analysis. Further investigation of the social networks of other academic departments that have similar approaches to the departments in this study are required, to determine if the level of flexibility affects the types of conversation instructors have with one another.

The fourth limitation relates to the formal role participants had in their academic department and the potential impact that role may have had on conversations with colleagues and their technology adoption in general. As reported in the findings chapters Four and Five, the language coordinators had the responsibility of designing WebCT Vista environments and sharing technologies

with the instructors. Therefore, the appointment status of the participants in a department (tenured track, non-tenured track, coordinator) may have impacted with whom they had conversations, the time of available to them for experimenting with technology, and overall factors influencing their decisions. In North America, for example, language departments tend to be two-tiered with non-tenure track instructors teaching language courses without having the autonomy to design their own curriculum unlike tenured or tenure track faculty (Modern Language Association, 2007). In addition, non-tenured faculty are often not eligible for grants or being in a position to lead research projects (Garrett, 2009) potentially hindering their innovation and experimentation with technology. Although both non-tenured and tenured language instructors participated in this study, future studies could specifically investigate whether appointment status affects instructors' conversations with colleagues or their technology adoption decisions.

The final limitation refers to the accuracy of the self-reported data. Although observational data on WebCT Vista environments provided objective information on how the participants used the learning management system, there was a lack of access for viewing how instructors used other educational technologies. When possible, future studies should strive to collect objective information about the technologies that the instructors use, through observations or system log files for enhanced accuracy. In addition, the self-reported nature of the data collected from either the pre-interview questionnaires or the interviews could be affected by social desirability bias if participants were inclined to

respond in a way that made make them look good (Beretvas, Meyers, & Leite, 2002). Hence, future research should include a social desirability scale such as the one developed by Crowne and Marlowe (1960), alongside other data collection methods, in order to determine the extent that the data is biased.

Since this qualitative study was focused exclusively on deeply exploring the ways that language instructors use educational technology, their social networks, their conversations with one another, and the factors that they consider most important for technology adoption, the delimitations and limitations of this study do not detract from the value of the results. The conclusions drawn from this study represent a step towards determining the factors that can be used by senior higher education administrators to predict technologies that instructors would choose to use. As mentioned earlier in this section, future studies with participants from other educational institutions can help strengthen or weaken the results of this study. For instance, future research may further determine that Davis' TAM can be used to predict technology adoption amongst foreign language instructors or it may reveal that other factors are more important. Furthermore, the results of this study showed that most of the participants discussed educational technology with colleagues within or outside of their departments at some point in their academic career, but less than half of them indicated that such discussion directly influenced their decisions. Future studies could further investigate whether such technology-related conversations amongst instructors influence their decisions to use a particular technology. Such studies could further explore the social networks of different academic departments to

determine if a similar pattern to the one revealed in two of the departments in this study is discovered. Finally, since all the participants in this study have adopted educational technology, future studies may include instructors who have chosen to use other non-technology teaching methods, in order to provide comparative data.

8.4 Concluding Remarks

The main purpose of this study was to investigate the factors that influence foreign language instructors to adopt technology with the aim that the results could help senior higher education administrators to make decisions about the strategies they should implement that would best promote technology adoption in their institutions. While the study was situated in social network theory and strove to determine the influence of instructors' technology-related conversations on their technology adoption decisions, the overall results supported Davis' TAM instead. The findings from this study are consistent with *perceived usefulness* and *perceived ease of use,* the two criteria for Davis' (TAM). However, due to the delimitations of the study design and the limitations encountered, future research is required to further investigate whether Davis' TAM can be used to predict or explain the technology adoption decisions of foreign language instructors or if other factors, such as conversations with colleagues, are more influential. However, despite the delimitations and limitations, this study adds to the scholarship of technology adoption amongst post-secondary instructors by revealing three very influential factors: a technology having the capability to facilitate easy access to information, enhance the learning experience by helping students meet their learning objectives, and lessen the workload of instructors.

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APPENDIX A: Interview Questions for Instructors

Questions for Technology (WebCT Vista) Adopters:

1. You are one of the faculty members using the learning management system, WebCT Vista as a supplemental to your on-campus course. How did you get to know about WebCT Vista?

2. How long have you been using WebCT Vista or another LMS (i.e. Moodle or Blackboard) at this education institution or elsewhere?

3. You have indicated on your questionnaire that you have used or are using tools such as _____ in WebCT Vista. What made you decide to use these tools? Please describe the experience for you and your students?

4. Do you use any other educational technologies for teaching purposes? If so, how did you learn about them? Please describe the experience for you and your students.

5. In your questionnaire, you have indicated that you discuss educational technologies (i.e. WebCT Vista) with the following faculty in your department _____. Did you have such conversations prior to using WebCT Vista? Would you say that you discuss educational technologies with them regularly (i.e. weekly)?

6. In your questionnaire, you have indicated that you discuss teaching strategies with the following faculty in your department _____. Did you have such conversations prior to using WebCT Vista? How would you describe these conversations?

7. Have you discussed the use of WebCT Vista with faculty members who do not use it? If so, with whom have you discussed WebCT Vista and what is their role in the department? To what extent, if any, do you think your conversation influenced the faculty member to adopt it?

8. Overall, what factors would you say have influenced you to start using WebCT Vista or to start using particular tools within WebCT Vista?

Questions for Technology (WebCT Vista) Non-Adopters:

1. Have you ever considered using WebCT Vista or other LMS (i.e. Moodle or Blackboard) as a supplement to your on-campus course? If so, how did you learn about it? Please describe the experience for you and your students.

2. Do you use any educational technologies for teaching purposes? If so, how did you learn about them? Please describe the experience for you and your students?

3. In your questionnaire, you have indicated that you discuss educational technologies (i.e. WebCT Vista) with the following faculty in your department _____. How would you describe these conversations? Did you have such conversations prior to begin using the tools discussed in the previous question?

4. In your questionnaire, you have indicated that you discuss teaching strategies with the following faculty in your department _____. Did you have such conversation prior to using or trying any educational technologies? How would you describe these conversations?

5. Have you discussed the use of WebCT Vista with other faculty members in your department? If yes, with whom have you discussed the use of WebCT Vista? How would you describe these conversations?

6. In your opinion, what factors have influenced your decision to not, as of yet, adopt the use of WebCT Vista in your teaching?

APPENDIX B: Information Letter for Prospective Participants

I am a doctoral student at Athabasca University and an employee of your local instructional support unit. I am currently collecting data for my dissertation that includes interviewing faculty and I would like to invite you to participate in this study. The major aim of my research study is to determine the factors that influence foreign language instructors, such as yourself, to choose to use or choose not to use a learning management system (i.e. WebCT Vista) for teaching and learning purposes. Furthermore, I plan to investigate whether instructors' social networks (i.e. the colleagues with whom you interact and communicate) influence the decisions to use a learning management system. Your involvement in the study will help the Faculty of Arts determine the types of resources required to support instructors, such as yourself, to use WebCT Vista. Hence, this study will greatly benefit from having participants who currently use WebCT Vista and those who use other teaching strategies. It will also give you an opportunity to reflect on the types of professional conversation you have with your colleagues and whether they influence your teaching approach.

Although you must be very busy during this time of year, would you be available for a half-hour in-person interview? This voluntary interview will be audio recorded, with your permission, and sections of our conversation, which will be analyzed for this study, will be transcribed and provided to you so you can review to make sure they are accurate. You are not obliged to answer any questions in the interview if you do not feel comfortable sharing the information.

Prior to the interview, I will also request that you complete a short questionnaire that will help keep the interview efficient. The interview should take approximately 20 - 40 minutes. The data collected for this study will be used in an academic published report (thesis) and for conference presentations but to ensure anonymity and to protect your identity, will not include any references to your name, the names of your colleagues, or the name of your educational institution.

Additionally, part of this study explores the use of various tools within WebCT Vista. Therefore, with your permission, I would like to take a look at your previous WebCT Vista courses, if applicable, to observe the different tools you have chosen to use in your teaching. Any course numbers or names in this observational data will also be replaced with random codes to protect your identity.

If, after having read the Information Letter to Potential Participants, you are interested in participating in this study, please read and complete the attached consent form and return it to me by e-mail or drop it off in person to my office. We can then arrange a time and location for the half-hour interview that is convenient for you.

APPENDIX C: Consent Form for Participating Faculty

Title of Research Study: Factors influencing technology adoption: A case study of foreign language instructors

Study Team

Principal Investigator/Research Supervisor: Dr. Debra Hoven, Athabasca University

Co-Investigator/Researcher: Negin Mirriahi, Athabasca University

This research is part of a doctoral graduate degree and is part of a thesis. The existence of this research and thesis will be listed as an abstract, available online through the Athabasca University Digital Thesis and Project Room (DTPR) and the final research paper will be publicly available.

Invitation and Research Purpose

As a foreign language instructor, you are invited to voluntarily participate in this research study conducted by a doctoral student at Athabasca University. This research study will investigate the factors that influence foreign language instructors to use or not use a learning management system, (i.e. WebCT Vista). The purpose of this study is to develop an understanding of the key factors that influence instructors' decisions and in particular to explore whether instructors' social networks (i.e. the colleagues with whom you discuss teaching strategies) affect decisions about using technology. The results of the study will help determine the types of resources required to support instructors in using educational technology.

Study Procedures

The study will involve one half-hour in-person interview and a short questionnaire prior to the interview that will take approximately 20 - 40 minutes to complete. You will be asked about the factors that you think influence your decision to use WebCT Vista or to use other teaching strategies. You will also be asked to list the colleagues with who you discuss teaching strategies to help determine if collaboration and communication influence instructors' decisions. All names that you provide will be replaced with non-identifying codes to ensure complete anonymity on any published or presented data. You are not obliged to provide answers to any questions that you do not wish to share. The interview will be scheduled for a time and location that is mutually convenient for you and the researcher and will be audio-recorded for transcription purposes. Transcripts of

the sections of the interview that will be used for analysis will be sent to you for your approval before data analysis begins and audio recordings will be destroyed after you have approved the transcripts. Additionally, the researcher will observe your previous WebCT Vista online sites, if applicable, to investigate the types of tools that you have chosen to use to enhance teaching and learning.

Study Results

The results of this study will be reported in a graduate thesis and may also be published in journal articles or books or presented at academic conferences. If you would like a copy of the results or the final report, please send me an e-mail request. The existence of this research and thesis will be listed as an abstract, available online through the Athabasca University Digital Thesis and Project Room (DTPR) and the final research paper will be publicly available.

Potential Risks and Right to Refuse

Participation in this study is strictly voluntary and there is no risk of physical or emotional harm. However, you may refuse to answer any questions in the interview that you do not feel comfortable sharing. Additionally, you may withdraw from the study at any time without any negative consequence during the data collection period. The data from your interview or the observational data of your WebCT Vista course sites will also be removed from the study.

Potential Benefits

The results of this study provide valuable information to administrators, support units, and researchers about the factors that influence instructors' decisions about educational technology. You will benefit from this study since the results will help your educational institution to determine the types of resources required to help instructors, such as yourself, to use educational technologies.

Confidentiality

Your identity will be strictly protected in this study as your name and the names of any colleagues you mention on the questionnaire and in the interview will be replaced with non-identifying codes as soon as you approve your interview transcript and before any data analysis begins. All transcripts and questionnaires with non-identifying codes will be in password-protected files on a password-protected computer and will be destroyed after five years. Audio

recordings will be destroyed after you have approved the transcript of your interview session. To further maintain your privacy, the name of your department and your educational institution will not be disclosed on any published material or at any conference presentations.

Contact for information about the study

If you have any questions about the study or would like more information, please contact the study team.

Contact for concerns about the rights of research subjects:

If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact the Research Subject Information Line in the Office of Research Services at your institution. Alternatively, you may contact the Athabasca University Research Ethics Board if you have questions or comments about your treatment as a participant.

Consent:

Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to pull out of the study at any time without giving a reason and without any negative impact on your employment.

Your signature below indicates that you have read and understood the information contained in this consent form and you agree to participate in the study, on the understanding that you may refuse to answer certain questions, and may withdraw during the data collection period.

Please return this consent form to Negin Mirriahi by e-mailing or dropping it off in person to her office.

Your name: _____ Date:_____

E-mail Address: _____ Phone Number: _____

Signature:_____

APPENDIX D: Pre-Interview Questionnaire

Please answer the following questions and return the questionnaire to Negin Mirriahi via e-mail prior to your scheduled interview. After the interview, your name and the names of any colleagues that you mention here will be replaced with non-identifying codes in order to protect your privacy and theirs.

1. Your name:
2. Your position(s) at the university (i.e. lecturer, senior lecturer, coordinator, etc.):
3. Are you involved in any committees in your department? Underline: YES or NO
    a. If you answered 'yes', please indicate the type of committee:
4. Do you currently use WebCT Vista? Underline: YES or NO
    a. If you answered 'no', have you used WebCT Vista in the past? Underline: YES or NO
    b. If no, have you used any other learning management system, such as Moodle or Blackboard in the past or currently?
5. If you answered 'yes' to question 4, which tools within WebCT Vista do you currently use? Please underline any that apply:
    a. Discussion Board
    b. Wimba Voice Board
    c. Online Quizzes/Self-Tests
    d. Online Assignments
    e. Weblinks
    f. Gradebook
    g. Posting files
    h. Other (please indicate which tools):
6. Please underline the statement below that best describes your usual reaction to a new technology:
    a. I am usually the **first** instructor in my department to try out a new technology, hardware, gadget, learning tool or software package

b. I am usually **one of the first few** instructors in my department to try out a new technology, hardware, gadget, learning tool, or software.

c. I **usually** try out a new technology once I have seen other instructors use it successfully.

d. I **will only** use a new technology for teaching once I have seen other instructors use it successfully.

e. I am **usually one of the last** instructors in my department to use a new technology.

7. Outside of teaching, which of the following software, gadget, or tool do you use? Underline all that apply.

   a. E-mail

   b. Social networking websites (i.e. Facebook, Twitter, etc.)

   c. Mobile applications on iPhone, iPad, etc

   d. Video-editing software

   e. Photo-editing software (i.e. Photoshop)

   f. Communication websites (i.e. blogs, wiki's, discussion boards)

   g. Skype

   h. Other (indicate the name of the technology):

8. A major part of this study, as mentioned in the information letter, is to explore the role, if any, that professional social networks have on instructors' technology adoption. In other words, do the colleagues that you communicate with influence your decisions to use or not to use WebCT Vista? In order to determine the effects of professional social networks, this question asks you to identify the colleagues that you speak to and the types of conversation that you have (i.e. personal, about teachin61g strategies, about WebCT Vista, etc.).

   Below is a list of all of the language instructors in your department. Next to the names of those you communicate with, please indicate all the types of conversation you have had with that person following this coding system:

   - Personal → code: P
   - About teaching and learning strategies → code: S
   - About curriculum → code C

- About WebCT Vista or other technologies → code: T

Also, please underline the names of your colleagues that you communicate with at least once a week when school is in session. If the name of one of your colleagues is missing, please add it to the end of the list.

Note: A list of language faculty in the participant's academic department will be made available.