Making the Connection:
Matching Pedagogy to TESL Student Teachers' Computer-Training Needs

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ABSTRACT

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Computer-related technology has become an integral part of modern-day society and education. Student teachers must acquire the training necessary to use computers as an instructional tool in their future Teaching English as a Second Language (TESL) classrooms. The objectives of this research were 1) to identify and describe student teachers' computer-training needs (attitude, skills, knowledge, and opportunities for role-modeling) in order to facilitate the use of computer technology in their teaching, and 2) to assess the impact of a "Computers in Language-Learning" course, which utilized a needs-based methodology, in meeting the computer-training needs of student teachers.

Participants were enrolled in a Computers in Language-Learning course at a Canadian university. Study 1, a pilot study, (N = 45) was conducted in Winter, 2001. The pilot study identified problematic aspects in the methodology (e.g. a high student to teacher ratio) and research design (e.g. no individual matching from pre to post). Study 2 (N = 22) was conducted in Autumn, 2001. Both studies followed a pre/post design. Student teachers' computer-training needs were measured using a self-administered Needs Assessment (NA), a Post-Internship Survey and a Self-Assessment (only used in Study 2), all three developed for this research.

Many of the trends in Study 1 were also present in Study 2. Pre-course qualitative data in Study 1 showed that attitude concerns were considerable issues for some student teachers. Some Study 2 student teachers expressed low-skill level concerns. Post-course comments in both studies revealed that the majority had a positive attitude change

and intended to use computers in their teaching. Both groups were lacking in faculty and supervising-teacher models. In each study, the quantitative data demonstrated that many student teachers began the course with weak skills and knowledge. Meaningful post-course gains were noted. The results of this research are comparable to other published research findings.

When compared to their pre-course computer skill and knowledge levels, the student teachers included in Study 2 showed statistically significant improvement in skills and knowledge upon completion of the course (mean difference in skill and knowledge scores from pre- to post-course = 20.9, Paired T-Test, $p<0.01$). No significant difference was noted among two groups of student teachers: above average pre-course attitudes and skills versus below average pre-course attitudes and skills. Regardless of the student teachers' entry attitude and skill level skills, they showed significant progress, in terms of their computer skills and knowledge, by the end of the course. Some of the self-assessments in Study 2 attribute these changes to the pedagogical intervention.

Recommendations for student-teacher computer-training include offering more frequent and higher-quality modeling among faculty and supervising teachers, adopting a technology-infusion model, continuing to revise and apply the needs-based methodology to the Computers in Language-Learning course, assessing learners' needs, and integrating the Quebec Ministry of Education (MEQ) guidelines. Further research is required in order to address the limitations of the current research (e.g. a lack of statistical testing in Study 1, small sample sizes, no comparison groups) and to validate the findings.

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Some people come into our lives and quickly go. Some stay for awhile and leave footprints on our hearts, and we are never, ever the same.

Your husband was an exceptional teacher and true humanitarian, and left an everlasting impression on my life!

These excerpts are part of a condolence card which was sent to my grandmother in the autumn of 1999; in 1932, my grandfather's first year teaching, the writer was a grade-two student in his one-room schoolhouse in Seven Sisters Falls, Manitoba. Years later, his former student still felt the benefits of her learning experience. When Dr. Joanna White suggested that I focus on teacher-training for my thesis, my grandfather's teaching, and other exceptional teachers whom I have been blessed to meet, inspired me to embrace this challenge. From her initial suggestion to thesis completion, Joanna has offered me opportunities, constructive criticism and encouragement. She is a superb academic role model because she is brilliant and profoundly human. Moreover, Concordia University has offered me excellence in terms of the two teaching assistants, a research assistant, the Research Group, Randall Halter and my two readers: Laura Collins and Marlise Horst. I am grateful to you all. Outside of the university were three key people who also helped me to complete this research. My father, Mr. Gordon King, worked diligently to format my material. Ms. Tracey Reid was wise and generous in her advice and data-analysis assistance, while Ms. Elizabeth Schinkel has been a careful editor and patient supporter throughout this endeavor. Finally to the student teachers themselves, thank you for letting me be your teacher-researcher; I am a better teacher than I was because of you.

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Chapter 1: Introduction

1.1 Introduction

The potential offered by information and communication technologies (ICT) in learning and instruction, combined with the role they play in society, means they are essential components of today's schools. ...Because of the presence of ICT in schools, teachers now need specific competencies... They also need new behaviours and new attitudes... The numerous possibilities offered by ICT will achieve their full instructional potential only if teachers are able to exercise firm control over the content of the activities and ensure that they allow the students to develop the target competencies (Quebec Ministry of Education, 2001, pp. 97-98).

The use of computers in society and schools has great potential. The above quotation applies to teaching English as a Second Language (TESL), for at the heart of this school subject lies the use of information and communication resources and skills. When using a computer to help improve language skills, an ESL (English as a Second Language) student has access to vast amounts of information from the Internet, language-learning software, presentation and word-processing tools to name but a few. This same student can improve his or her communication skills by accessing authentic language while on the Internet. It might be as simple as visiting an ESL site such as Dave's ESL Cafe (http://www.pacificnet.net/~sperling/eslcafe.html), emailing or chatting on-line with a native speaker, or as complex as building a collaborative, customized ESL-resources web-page with students who are located in other parts of the world. Learning a language is a time-consuming process; there is room for the computer to identify some of the norms within the English language and help ESL students to note their deviations from

these norms. For instance, many computer tools can be customized for ESL students in order to provide immediate corrective feedback on certain types of language errors. Examples of language-learning tools range from spell checkers, thesauri, on-line dictionaries and concordances to customized reading texts with highlighted, auditory, visual and reference support. The numerous possibilities offered by computers in TESL, as well as their common use in today's world, means they are vital in the second-language classroom.

In order to use the wide range of computer applications currently available for language teaching, ESL teachers require certain competencies themselves. Although teachers have different opinions on what quality education entails, we all enter our classrooms with the same mission: to help our students learn. When my students acquire competencies and experience success, I feel honoured to belong to such a challenging profession; the true challenge is to achieve this mission on an on-going basis while using the most effective techniques.

When the idea of teaching the Computers in Language Learning course was first proposed to me, my mind raced with possible course content and teaching strategies while my heart was filled with joy and fear. Before responding to the proposal, I reflected upon my own attitudes and computer skills, and asked myself the following questions: Did I have the right attitude to promote the use of computers in language learning? Was I skilled and knowledgeable enough? Could I offer the student teachers a positive role model? Now that I have taught the course twice, I can answer the questions with a resounding "yes", and yet, the quest for more answers continues as I acquire more skills and broaden my knowledge base. A large part of this work consists of identifying

and understanding my TESL student teachers' needs. In understanding their needs. I am better positioned to offer them the essential attitudes, role models, skills and knowledge required to use computers in TESL contexts.

1.2 The Steps

The challenge of assessing needs and responding pedagogically is the topic of this thesis. I explore my student teachers' training needs, within the context of teacher-training competencies and classroom requirements, and conclude with instructional interventions. The process includes the following:

1. Examining the relevant literature on student teachers and computer training, especially in the areas of attitude, skills, knowledge, the role of modeling, course design, and teaching English as a second or foreign language;

2. Presenting a rationale and specific methodology to meet their training needs, the teacher-training competencies, and classroom requirements;

3. Analysing the pre- and post-survey data gathered while teaching the Computers in Language Learning course (TESL 330, winter 2001) in order to identify student teachers' needs;

4. Analysing new data-collection instruments, as well as the revised pre- and post-survey data gathered while teaching the Computers in Language Learning course (TESL 330, autumn 2001) in order to better identify student teachers' needs;

5. Interpreting the results as they apply to the specific methodology and the student teachers' training needs;

6. Giving recommendations for training student teachers to use computers in their English as a second language classrooms, stating the limits of the research and offering future research suggestions .

Chapter 2: Literature Review

2.1 Introduction

Teachers must know how to use computers within an educational setting because of their powerful pedagogical potential and their central role in today's society. This presents many challenges, not the least of which is that technology is constantly changing. Teacher-training institutions have a number of issues to consider. These include the need to provide relevant instruction; the compatibility of some computer-based applications with recent, research-driven approaches to teaching and learning; student and parent expectations; and guidelines from Ministries of Education, school boards and professional bodies (Abdal-Haqq, 1995). In a survey of student-teacher graduates, the American Office of Technology (1995b in Abdal-Haqq) noted that even though 50% said they were able to use drill and practice, tutorials, games, word-processing and publishing applications, fewer than 10% felt competent enough to use multimedia and presentation packages, electronic network capabilities or problem-solving applications. Even if the abilities of the 50% are useful in a school setting, it is the skills which only 10% of the graduates have that are needed if we are to teach our students to use technology in effective ways. In order to ensure that future teachers are prepared to use technology successfully, teacher-training institutions must show them how by designing courses that integrate technology and providing opportunities for faculty to model effective uses of technology (Abdal-Haqq).

Several studies have investigated the computer-training needs of student teachers. In the first to be discussed here, Levin (1999) examined four key factors that relate to student teachers' needs: sense of efficacy for using computers in their teaching; attitudes

about using computers; computer-technology skills and knowledge; and actual use of computers during internships. In one group of 22 student teachers, some were given additional instruction about integrating technology into the elementary-school curriculum. This included ways to integrate computers, computer-skill acquisition and teaching three technology-related lessons every semester in their placement classrooms. Of the 22 student teachers, ten students volunteered to complete all aspects of the additional training over the two years

All participants were surveyed three times during their teacher-training. Because of the small sample size, the findings are presented descriptively. In both the non-volunteer group, who received some technology training, and the volunteer group, who completed all aspects of the technology training, mean scores for self efficacy, attitude, skills and knowledge improved over time. However, the mean score for the volunteer group showed greater increases over time (Levin, 1999). As well, the study includes student teachers' comments about their training-needs; self-efficacy, attitudes, skills and knowledge, modeling opportunities are all mentioned. The data also gave information about how the student teachers used computers in their lesson plans (mostly in the areas of reading and writing), and many qualitative statements which attribute positive changes to their training needs due to instruction and modeling opportunities.

In a second study which delineates student teachers' skills and attitudes toward using computer technology in the classroom, 205 participants completed a survey on computer-competencies and attitude during the first day of an introductory course (Fisher, 2000). Assessing computer competency entails breaking down the larger term into a set of skills. To determine a suitable list of computer-literacy items, the researcher

compiled an initial list, refined it by referring to educational media and technology course materials, and then had it reviewed by technology-resource teachers. The list includes skill self-assessment in the areas of word-processing, spread sheets, database software, the Internet, email and presentation software. Measures of attitude include statements such as " I will enjoy using computers when I teach", "I hesitate using a computer for fear of making mistakes that I can't correct" and "If somebody helps me with the computer, I can do a lot of things I can't do on my own" (p. 115). The student teachers used a five-point scale with 1 representing *strongly disagree* and five representing *strongly agree,* and also completed a free-response section.

In this study, almost 86% of the respondents classified themselves as experienced users, or as having some basic computer knowledge; Fisher (2000) sees this as an encouraging indicator of skill level. One of the top attitude responses, with a mean higher than 4.0, was "I expect to use computers when I start teaching" (p. 118). The researcher interprets this response and others like it to be an indication of positive student-teacher attitudes. However, the results also include many concerns regarding network congestion, finding credible web resources, and solving technical difficulties. Finally, the analyses of the student teachers' skills and attitudes are used as recommendations for course design. They include supporting student teachers in the area of general skill development; acquiring these general skills within a teaching environment; modeling good technology practices; and using instructional strategies to decrease computer anxiety among student teachers.

In the literature reviewed above a number of factors have been identified as important in training student teachers to use computers in their future classrooms. First,

the teacher-training institutions have to create opportunities for modeling, technology-infusion within the program and well-designed courses (Adbal-Haqq, 1995). Second, it is necessary to identify student teachers' specific training needs (Levin 1999). Third, identifying these needs in areas such as such as skills and attitudes requires effective measurement tools where the results can be used to improve course design (Fisher, 2000). Having outlined some of the priorities for training student teachers to use computers, the review turns to a closer examination of the student teachers' computer-training needs

2.2 Attitude

In the wide body of research which examines the relationship among computer-training, course design and student teachers' needs in the areas of attitudes, skills and knowledge, and modeling opportunities, attitude has the largest body of literature. Work in this area includes defining key concepts; designing and testing measurement tools; measuring and assessing attitude, self-efficacy, computer anxiety and negative feelings about information technology (IT) (Gunter, Gunter & Wiens, 1998; Hardy, 1998; Hunt & Bohlin, 1993; Larose, Lafrance, Grenon, Roy & Lenoir, 1998; McInerney, McInerney & Sinclair, 1994; Ropp, 2001; Savenyne, 1993; Watson, 1997). Hardy's literature review on *Teacher Attitudes Toward and Knowledge of Computer Technology* includes a section on operationalizing computer anxiety and another on teacher-education programs. The labels "computerphobia", 'technophobia', 'cyberphobia', 'technostress', and 'computer fear' are used to describe the aversion that some individuals feel toward technology (Bailey,1994; Yeaman, 1998 in Hardy, p. 125). According to George and Camarta (1996), "computer anxiety is the tendency to experience uneasiness or stress over the use

of any technology related to computers . A person's aversion to technology, 'cyberphobia', may appear as general anxiety, 'cyberanxiety', about using technology" (p. 125). Computer-anxious teachers may not use technology with their students because they do not feel confident or comfortable, and may even be fearful. Although many researchers and teachers, including myself, feel it is important to acknowledge the role that computer anxiety plays in teacher training, one writer, Yeaman (1993), believes the concept of computer-anxiety to be a society-perpetuated myth. He warns against instructing the myth because he believes computer anxiety can be learned (in Hardy). As for teacher-education programs, it is recommended that these programs include course work on computers and their uses in educational settings (Hardy), for many student teachers said they feared integrating technology and had no instruction in their programs (Faison, 1996, in Hardy). One step in addressing the fears and lack of training is to ensure that new teachers have contact with proficient teacher-educators who are sensitive to computer anxiety.

Since there is often a negative relationship between previous computer experience and computer anxiety, Ropp (2001) surveyed student teachers on variables such as their technology proficiency, computer anxiety and computer self-efficacy to see if instruction led to measurable improvement. She notes the particular importance of measuring computer anxiety because of its incapacitating effects on achievement. Definitions of computer anxiety include "... the mixture of fear, apprehension, and hope that people feel when planning to interact or when interacting with a computer" (Rohner & Siminson, 1981 in Ropp, p. 2) and "...feelings of anxiety, including worries about embarrassment, looking foolish, or even damaging a computer" (McInerney, McInerney & Sinclair, 1994

in Ropp, p. 2). Self-efficacy, on the other hand, refers to how we judge our capabilities to plan and accomplish courses of action required to achieve specific competencies; its defining characteristic is not the skills we actually have but the judgements we make about what we can do with our skills (Bandura, 1982 in Ropp, p. 3). While computer anxiety and self-efficacy are defined by explanations and descriptors, technological proficiency is usually understood to be a list of key skills. For example, in Ropp's study, the proficiency measure is a list of 20 skills related to email, Internet and software-applications use. The 53 student teachers were surveyed at the beginning and end of the semester. The initial survey shows a wide range of abilities and attitudes; whereas the post-survey indicates significant improvements in proficiency and efficacy, there are no significant changes in computer anxiety. Although the initial anxiety scores were low, Ropp questions whether more experience truly reduces anxiety. However, she also points out that the constructs measured by the scale might be different than those addressed in the instructional sessions. Furthermore, these sessions may have been too brief for measurable change to occur. She calls for more research to determine the relationship between instruction and proficiency, anxiety and self-efficacy.

Though Ropp's (2001) results did not show any significant anxiety change due to instruction, other research offers different findings. In 1993, Savenye used pre- and post-surveys with 73 student teachers enrolled in two five-week computers-in-education courses. Her Computer Literacy Attitude survey contained open-ended questions and fifty Likert-scale items on factors related to computer anxiety, computer confidence, liking computers and valuing computers. Information on demographics and computer experience were in an accompanying questionnaire. On twelve items, there were pre-post

differences significant at the $p < .001$ level. These items were in the area of anxiety and related factors, such as confidence in learning and using computers. There were also significant differences in the three items related to liking computers. She attributes these positive changes to a hands-on approach to training. Gunter, Gunter and Wiens (1998) also make a connection between change and course design. For instance, they attribute the statistically-significant decrease in anxiety and the increase in positive attitude toward computers to their intervention: a specially-designed computers-in-education course. Their particular course design used a high impact and low threat approach. The high-impact component refers to the many different computer and education topics covered during the course, whereas the low-threat aspect includes motivation and empowerment components and the absence of traditional testing. Instead of testing, mandatory class attendance, hands-on exercises, projects, reflections and presentations were the assessment tools.

Watson's (1997) research also indicates a need for competency training to address student teachers' low computer-efficacy feelings and negative attitudes toward IT. She asked 234 student teachers to respond to the following message: "Write about two paragraphs on your views of the computer systems you have been using at university... describe your feelings ... on their use, how helpful and frustrating they have been..." (p. 259) . To interpret the qualitative data, she coded the free-responses using an Open Coding method (see Strauss & Corbin, 1990, in Watson). The main categories that emerged were computer self-efficacy and attitudes with subcategories of positive and negative applied within each category. It is useful to note that 74% of the participants were less than 20 years old and therefore mostly belonged to a generation where

computers have been widely available in schools. However, some participants' perceptions of themselves did not reflect this reality. Nonetheless, their perceptions were often age and gender related: "Older students and females were far more likely than males to express negative feelings about IT and have lower computer self-efficacy" (p. 267). Despite the above-mentioned obstacles for some student teachers, in general, the IT training was positively received. Watson's research shows a need for skills-based instruction which is tailored to a variety of different learners.

The studies in this section help us to operationalize concepts related to attitude such as computer anxiety (Hardy, 1998) and self-efficacy (Ropp, 2001). In contrast, technical proficiency is defined by a list of key skills rather than explanations (Ropp). Among the four studies which examined the relationship between computer anxiety and instruction, useful methodologies include pre- and post- surveys (Gunter et al, 1998; Ropp; Savenye, 1993) , an analysis of the course design (Gunter et al) and an examination of qualitative data (Watson, 1997). In the next section, we will see how computer experience, outside or inside the classroom, might positively influence negative attitudes, or anxiety.

2.3 Attitude and Computer Experience

Student teachers in computer-training courses differ in gender, age, attitude toward technology, and computer experience. These differences play a role in instruction and challenge the teacher-trainer to design a customized curriculum. Before customization is to begin, however, we need to know more about each of these differences and how they might affect each other. For instance, some research indicates

that computer experience (skill level and time spent using computers) affects attitude. Hunt and Bohlin (1993) wanted to establish the entry attitudes of student teachers enrolled in a computers-in-education course. They surveyed 518 respondents to determine if gender, age or computer experience had an effect on computer enjoyment, confidence and anxiety. The instruments included demographic data, five questions about students' previous experience using computers, and the Computer Attitude Scale. This scale has 40 statements about computer anxiety, confidence, usefulness and liking. Respondents specified how much they agreed or disagreed with each statement. Strong differences emerged when the respondents were grouped by previous computer experience versus no computer experience. For instance having extensive experience either with word processing, using computers for recreation, computer programming or data bases, all corresponded with lower anxiety scores. "Recreational use of computers was the strongest predictor for the liking and confidence subscale scores" (p. 494). These applications accounted for 32% of the variance in anxiety scores and were positively correlated with having confidence in one's ability to use computers. Although this might not be a cause and effect relationship, it suggests that certain types of computer experience may be associated with attitudes toward computers.

McInerney, McInerney and Sinclair (1994) also found evidence to support the idea that increased experience leads to a decrease in computer anxiety, but they also found that this is not a simple relationship. Unlike much of the work in this area, theirs included a control group who did not have a computer-training course in their timetables for that semester. Like Hunt and Bohlin (1993), they used the Computer Anxiety Rating Scale. The experimental and control groups were in the same educational psychology

course and were surveyed at the beginning and end of the term. Of the 101 respondents. 40% showed considerable anxiety on the pre-survey. The post-test results show a decline in the percentage who answered in the "fair amount" to "very much" range on computer-anxiety items. However, 20% still expressed a sizeable level of anxiety on many questions, 48% expressed anxiety about writing a computer program and 40% showed anxiety about being unable to receive information because the computer is down. Although being familiar with a number of computer applications and finishing a word-processing course did reduce anxiety, a number of student teachers still remained anxious after having completed the Educational Computing course. A significant contribution of this study is the observation that the inherent process of averaging anxiety scores masks an important population: those individuals with high anxiety scores. McInerney et al. call on future researchers to include qualitative analysis to identify moderately and severely anxious student teachers so that their instruction includes remediation and performance maximization. They also make an urgent request for research on identifying the type of training that helps prevent initial anxiety from escalating. Suggestions include building confidence, individualization, and providing a non-threatening learning environment.

Finally, a study at the University of Sherbrooke shows varying degrees of change in computer literacy and attitude among 169 student teachers who completed a early-childhood education methodology course which integrated the use of technology (Larose, Lafrance, Grenon, Roy & Lenoir, 1998). The difference in attitude change is explained by the type of skill acquired. In this case, the student teachers were exposed to different types of technology; for example, they were given the opportunity to further develop specific skills in certain areas: discovering email and navigating the World Wide Web

(WWW), and using self-assessment software and on-line learning activities. Those who explored email and Internet surfing had the best levels of self-efficacy and the most positive attitudes. In fact, some of the on-line activities included self-assessment features which were directly related to the course content. These activities were used the most frequently and a positive change in attitude was observed. The researchers argue in favour of self-assessment feedback activities to reduce tension, monitor individual progress and offer positive reinforcement.

In summary, research reviewed in this section suggests that computer experience and computer instruction play a role in changing attitude and decreasing computer anxiety. These results are influenced by course design and individual factors, such as level of anxiety, but also, by the acquisition of skills and knowledge.

2.4 Skills and Knowledge

Having the 'right' attitude is not enough; skills and knowledge are also required for the successful use of computers in the classroom. Moreover, student teachers must posses a body of knowledge and skills that are contextualized within a teacher-training methodology which includes opportunities to use them appropriately in their teaching placements. Cuckle, Clarke and Jenkins (2000) surveyed 427 British student teachers on their range of information and technology skills, and the extent to which these skills were used in their internship placements. As well as examining the group as a whole, Cuckle et al. grouped participants by subject specialization to see if there were differences. Survey One, given at the beginning of the one-year teacher-training certificate, established a baseline description of student teachers' ICT competence. Survey Two was

given at the end of the program to assess possible skill-assessment changes related to the ICT course, use of ICT in their own studies and use of ICT in their placements. The results of Survey One show a difference in ICT competency scores based on subject specialty; English and history student teachers had lower scores (Kruskal-Wallis, chi-square + 33.98, $p < 0.001$) than student teachers in math, biology, chemistry and physics. Overall, the highest level of competence was reported in word processing, followed by the Internet use and spreadsheets, and finally use of CD-ROMs, databases and desktop publishing.

Of the 67% of the cohort who completed Survey Two, beginner-level competence was not related to use of ICT in internship placement in general. Instead, an analysis of variance shows that the main factor influencing classroom use of ICT was subject specialty. The subject specialities with the lowest use of ICT were English, German, French, History, Religious Education and Spanish. Overall, despite reported improvements in skill level while in placement, 48% of respondents said they used ICT sometimes, 36% stated only a little use and 16% reported no use with their learners. As for the variance by specialization in terms of skill level and use of ICT in placement, the researchers discuss these results not in terms of differing aptitudes but relate it to the subject areas themselves. "There may be more obvious uses of ICT for more numeric subjects such as the sciences and maths as opposed to less numeric subjects such as humanities and languages."(Cuckle et al, 2000, p. 17). "...ICT may challenge traditional teaching skills e.g. in the arts and particularly modern languages, where teachers sometimes believe that teaching and learning depend on a 'face-to-face' approach and

may find it difficult to understand how ICT could supplement (rather than replace) their approach" (p. 17).

Russell, Finger and Russell (2000) used their teacher-survey results on IT skills to make recommendation to teacher-training institutions in terms of skills and knowledge training. The results of this Australian study involving 400 schools showed that many teachers had significant skill-deficit areas. Many saw themselves as competent with basic computer skills like starting a program, moving files, creating a new document, and printing a document, but had less confidence with advanced-level computer activities such as sending email, using spreadsheets, searching the WWW and making a web site. The authors argue that teacher-training in the use of technology is characterized by the provision of low-level skills. To improve this situation, the authors use their results, as well as other research findings, to propose a model for training student teachers to use technology. First, they emphasize the need to teach advanced computer skills as well as "skills in designing and implementing curricula using technology" (Russell et al, p. 161). Their model includes the integration of knowledge and IT skills within a subject specialization, time to create IT lesson plans, the opportunity to see what exemplary teachers can achieve with IT, and knowledge of the available IT resources.

Although many agree on the basic premise that skills and knowledge are indeed required within teacher-training programs, there has not been enough discussion on what specifically this might entail in terms of course design. Leh (1998) selected four American universities to examine the structure, skills and knowledge in their IT course design. Two of the teacher-training programs offer several computer courses, but they are not required. In the two other teacher-training institutions, where a computer course

is required, the structure of the course differs; one is a combination of lectures and lab sessions, whereas the other is conducted entirely in the lab. Courses in all four schools include concepts such as knowledge of computer hardware and how the Internet works. along with skills in the areas of word processing, spreadsheets, databases, email and web page development. Three of the courses also have their student teachers learn multimedia and presentation applications. One school requires student teachers to complete IT lesson plans while another encourages them to complete field-assignments where they observe a classroom teacher who uses IT. Three courses include software-evaluation information; none of them cover web-page evaluation. In three of the four schools in this study, the course is offered as a separate educational computing course. Although more difficult to achieve because it involves more faculty who have IT competency, one institution offers technological integration within their methodology courses. Despite the differences in structure and course content, the following were common to all four schools: word processing, spreadsheet, database, multimedia, presentation, email, Internet searching and web development, as either concepts and/or skills.

We have seen that there is a need for teacher-training institutions to offer advanced-level computer skills and technology-curriculum skills (Russel et al, 2000). Although institutions vary in how they attempt to achieve this goal, eight computer skills, some basic and other advanced, were taught in all four schools in Leh's (1998) study. Most importantly, modern languages was one of the subject areas with the lowest use of ICT in the classroom (Cuckle et al, 2000). A practical explanation for this finding is that the use of ICT may challenge traditional beliefs about teaching, such as the necessity of a 'face-to-face' approach, and that it is necessary to make explicit how ICT could

compliment, rather than eliminate, this approach. The next section offers another possible explanation for this finding: a lack of modeling opportunities.

2.5 Modeling Opportunities

Most students in teacher-education programs are given the opportunity to learn in a variety of ways in their course work as well as in their field experiences. For example, observing how other teachers, either their teacher trainers or supervising-teachers, use technology offers student teachers models to guide their own teaching. Few would debate the crucial role which modeling plays in teacher-training and yet, positive technology-user role models are not a given. Research by Carlson and Gooden (1999) shows that word-processing was the only technology modelled consistently among the instructors of the 411 student teachers they surveyed. This result was the same for both their professors and their supervising teachers. In another study which only examined teachers in field placements, the results are no better. Among the 187 student teachers surveyed, 71% never saw their supervising teacher use computers for instruction. Among the remaining 29%, teachers only modeled the use of computers in instruction for drill and practice (10%), for games as a reward for good behaviour (9%), to prepare their own work (8%) and as a means of making up work missed during absences (2%) (Bosch & Cardinale, 1993).

Attempts to improve this situation have been incorporated into programs offered by teacher-training institutions in different ways. In one teacher-education program, professors designed a course based on constructionism and modeling (Willis & Tucker, 2001). Their new approach, which has yet to be evaluated by the students, includes

modeling and practice in using technology for higher-level thinking, pertinent and motivating activities and hands-on integration within a meaningful case-study design. In another course which emphasized technology integration and modeling, in pre- to post- surveys, student teachers showed significant improvements in their attitude toward using computers to work efficiently and communicate effectively and had significant decreases in computer anxiety (Thomas & Cooper, 2000). Another teacher-training program has attempted to improve modeling opportunities for their student teachers by offering field-placements with supervising teachers who integrate technology into their teaching (Dawson & Norris, 2000). Because it is still difficult to find enough technology-using supervising teachers, they invited all interested teachers to a technology-training course. The two groups received technology training together over the summer and then in the fall, the newly-trained student teachers completed their field-experiences with the recently-trained supervising teachers. The results show a variety of attitude and skill gains for both groups.

Research in this area clearly delineates student teachers' need for ICT modeling opportunities in their training. Student teachers in the arts and modern languages may have a greater need for modeling opportunities because it may be harder to understand how ICT plays a role in these fields (Cuckle et al, 2000).

2.6 TESL Research

The research sections outlined above serve to explain the factors and issues identified in the teacher-preparation literature within the area of training student teachers to use technology. These include attitude, computer experience, skills and knowledge,

modeling opportunities and information about how these factors affect course design. It is also necessary to consider the subject specialization to find out how technology-training works within a TESL context.

It is logical to assume that those preparing to teach mathematics require different technology-integration competencies than those who wish to teach ESL. Although some computer skills are common to both areas of study, how these skills are used, when they are used, and how often they are used vary depending on the subject specialization. For instance, consider the approach to language learning that is implemented in Quebec, namely, the communicative approach which "emphasizes the communication of meaning" (Lightbown & Spada, 1993, p. 73). It is also necessary to consider the MEQ program where for example, ICT plays a role within all three of the ESL competencies at the primary-school level (Quebec Ministry of Education, 2001a). Using computers with partners to complete tasks, and using the Internet for consultation and correspondence are two listed examples for teachers on how to integrate computers into the ESL competencies (p. 108).

Two possible computer applications compatible with the communicative approach and the MEQ program for primary-level ESL are key palling that is email pen pals and web-based bulletin boards. The latter is a discussion where participants types messages and send them to a central server where they are all displayed on an electronic bulletin board. The discussion is connected, or threaded, by each person's message, or posting. Not only do TESL student teachers need to understand the technical skills behind these two applications, they must design their pedagogy to include features of communicative language teaching such as authenticity, information gaps and the negotiation of meaning.

They must also ensure that the required keypalling and bulletin-board tasks are effective examples of integrating ICT into the three ESL competencies. Using the Internet is not the only computer tool that requires a focus on subject specialization. Where a mathematics student teacher might want to acquire the basics of presentation software such as PowerPoint, a TESL student teacher would want to invest more time in learning presentation-software skills because a dynamic tool such as PowerPoint offers the necessary support for auditory and visual input often required in a language-learning classroom.

Although, there are not many articles which directly examine the use of computers in second-language teacher-training, the five studies outlined below are relevant to TESL. Despite weaknesses in research design of the latter two studies, they all merit discussion because of their specific focus on technology within a language-learning context.

Wildner (1999) describes the planning process and initial steps of the implementation of a model of technology integration into a foreign-language teacher-training institution. After rationalizing the need for technology integration within teacher-education programs, she discusses four possible models: 1) the single course option, 2) technology infusion into many courses, 3) individual student-performance tracking and 4) a case-based approach (see Gillingham & Topper, 1999 in Wildner, pp. 230-233). While the first two models are self-explanatory, in the individual student-performance tracking model, the student teachers are responsible for acquiring the technology competencies and demonstrating their progress by choosing technology-enhanced projects and performances during their program. In the case-based model,

student teachers examine case studies of teachers using technology. The case studies are collected from field experiences. The student teachers view the teacher's lesson plan and listen to note the teacher's comments on how technology shapes his or her teaching. Although there are advantages to using this last approach, there are very few case studies available of language-teachers modeling the use of newer technologies (Wildner). Because of this drawback, as well as some of the disadvantages of the second and third models, her school chose a single course option for their initial model. An examination of the course description and outline reveals five objectives. These objectives were established by national guidelines, topics related to language learning (language labs, technology applications, resources, cases studies, integration and assessment techniques for language learning) and a demonstration then application structure used on a regular basis. While the author appears to be pleased that her faculty has implemented an instructional-technology course, the ideal, long-term goal of her faculty is to "gradually shift to a fully integrated approach" where technology is infused into all methodology and core-course work (Wildner, p. 234). Other teacher-training institutions require a different model or adapt an eclectic style, as Wildner's department initially did, so as to make use of some of the advantages within each of the four approaches.

The goal of fully integrating technology into teacher-training, foreign-language courses, proposed by Wildner (1999) above, is detailed by Kahmi-Stein (2000a). This teacher-researcher offers concrete examples of how the use of two computer-mediated communication (CMC) tools are integrated within a TESOL (Teaching English to Speakers of other Languages) practicum course. The author mentions a number of advantages of CMC tools. These include having a structure where the student teachers

assume leadership roles by posting questions and contributing to a body of shared knowledge, giving learners the option of working at their own pace, creating a 'comfortable' platform for shy and non-native speakers, and offering a chance of participating more frequently and in different ways when compared to a traditional classroom discussion where the teacher often dominates the discussion within an initiation, response and evaluation pattern.

Along with completing 30 hours of supervised field training and handing in a reflective portfolio, student teachers in this course must participate in electronic bulletin-board discussions and email dialogue journals. These CMC tools do not replace face-to-face interaction, but serve instead to enhance and vary the communication process. For instance in the electronic bulletin-board discussions, where public, shared knowledge is constructed, the onus is on the student teachers to lead the discussions by posting a weekly question or reflection. Not only does mandatory participation eliminate feelings of isolation which some student teachers experience during placement, the supervising teachers are invited into the electronic classroom too and thus become easy-to access mentors. The supervising teachers have the opportunity to not mentor their own student teacher, as well as the whole class of student teachers as everyone has access to the electronic bulletin board (Kahmi-Stein, 2000a). While participants request, exchange and share information, a sense of community is established. In contrast to this public forum, the email dialogue journals are weekly private communications between each student teacher and the professor. As well as encouraging student teachers to share their concerns, give and receive feedback on their lesson plans, and self evaluate, if necessary, the professor is able to offer private emotional support. At the end of the practicum, as

part of their portfolios, the student teachers reflect on how they might use these CMC tools in their own classroom. The author concludes by offering the following four guidelines for integrating CMC tools into practicum courses: seek advice from the school's computer centre to determine the CMC options and platforms, offer hands-on instruction on how to use the CMC tools, have rules for using CMC (e.g. avoiding a negative tone) and establish realistic expectations for participation, especially for the supervising teachers.

Kamhi-Stein (2000b) offered another example of integrating CMC tools into a TESOL course. She compared the use of electronic bulletin-board discussions to whole class, face-to-face discussions within a Methods of Teaching Second Languages course. She employed a computer-use survey to classify her 20 learners into four comparison groups: native English speakers who were frequent users of CMC tools, non-native English speakers who were frequent users of CMC tools, native English speakers who were not frequent users of CMC tools and non-native English speakers who were not frequent users of CMC tools. She collected qualitative and quantitative data on these four groups. The quantitative data were the transcripts from two types of discussion formats: whole class, face-to-face discussions versus electronic bulletin-board. The transcripts were analysed in terms of participation rates and structure.

In terms of participation rates, there were no statistical differences between the number of turns contributed by non-native speakers and native speakers in either discussion format, but in the web-based discussions the student teachers contributed a much greater amount than the instructor. Thus, they played a greater role in communicating and assuming responsibility for the discussion; skills which they will

require later as teachers. As for the structure, the classroom discussions reflected an initiation, response and evaluation structure where knowledge was displayed and in which the instructor played a large role. In contrast, the web-based discussions were mostly made up of student interactions where knowledge was shared, as opposed to displayed, in supportive and collaborative ways. Note that for the above-mentioned results, Kamhi-Stein did not examine the student teachers in terms of the frequency with which they used CMC tools.

Her qualitative data included 12 semi-structured interviews with three selected learners from each of the four groups. The interviews provided information on attitudes toward the web-based discussions. All student teachers, regardless of their first language and frequency with which they used CMC tools, were positive about the use of web-based discussions for 'hearing' many peers and perspectives, working at their own time and pace, and four non-native speakers said that the format helped to reduce cultural and linguistic barriers. This study offers a clear example of how to integrate technology into TESOL teacher-training programs. It also takes advantage of technology to promote a discussion structure with increased student teacher participation rates and leadership roles.

The fourth study, Leh (1995), reports on how foreign-language instructors are encouraged and shown how to use technology in their teaching. Examples of technology include audio-visual material, multimedia computer uses, computer authoring tools, and the Internet for research and email purposes. Leh begins her paper by suggesting three ways in which technology is helpful in foreign-language instruction. For instance, using technology permits learners to work with authentic material, such as the many listening

and reading materials on the Internet, as well as offering opportunities for written communication. She also points out that the linguistic proficiency level of the instructor may be another reason to use technology. Since many foreign-language teachers are not native speakers themselves, it is wise to include native-speaker speaking and writing models. Even when this is not a factor, it is good for students to be exposed to a variety of speakers and writers. These models are available in audio, video, CD and Internet formats. Finally, students, especially those in multi-level groups, benefit from technology-based instruction because it can be interactive and individualized; for instance, computer assessment can include immediate and individual feedback.

In her study, Leh (1995) used four simple questionnaires to assess the skill level and attitude of 12 foreign-language teachers over a two-week training period. The first and second questionnaires, given prior to the course, included self-assessment measures on email, computing, programming and digital familiarity, as well as questions on attitude. The teachers were also asked if and how they had used technology in their teaching. The third and fourth questionnaires, given half-way into the training and then again at the end, included 10 to 15 questions with a self-assessment range from one to five on skill and attitude levels. Participants were asked if they would use their new skill in their teaching and if so, how. Before the course, 45% knew nothing about computers in general, 55% knew nothing about email and only 33% had used technology in their teaching. Of the seven teachers who completed the two-week training, all of the averages were higher than after the first week, especially in the area of skill acquisition. Overall though, the teachers' general attitude toward using technology in language learning did not change much. This result is explained by the strong positive attitude held by many

teachers before the intervention. The intervention in this study includes similar training techniques as those used in other teacher-training courses, as well as a hands-on approach and content like email and Internet basics. However, there is some specific language-learning methodology: including sound in authoring programs, listening to a talk about how to use email in Spanish class, and designing flow charts to teach passive voice. Not only does Leh's study offer an effective rationale for using computers in the language-learning classroom, it shows how training can improve skill level. However, the sample size was small and the participants were not student teachers.

The researcher in the last study to be mentioned, Gray (1996), had 26 modern-language student teachers complete a straightforward questionnaire regarding their IT abilities on entry and exit, their attitudes towards computers, their intention of using them in their future careers, their opinions on how the IT aspect of their methodology course could be improved, and their experience with IT during their two internship placements. Their IT curriculum included an introduction to the institution's computer facilities, an overview of their expected IT competencies, and booklets and a model for monitoring their own IT competencies during their program. In contrast to most IT training, the hands-on sessions, such as word-processing, data management and spreadsheets, were optional.

Overall, most of the results, expressed in very general terms or with ordinal numbers, are quite positive. For example, all respondents felt they had made some improvements in their IT abilities; those who attended the hands-on optional sessions felt they had made the most progress. Gray (1996) notes "those who had some experience of the use of computers in the classroom were more confident about using them in their new

posts irrespective of their own level of skill, and quoted a wider range of potential uses and benefits" (Gray, p. 58). Unfortunately, only half of the student teachers were able to use computers in their placements and the majority of these had only isolated experiences.

It is rather unfortunate that in Gray's (1996) IT training description, she makes no mention of the course content within the course design, nor does she explain her data compilation process. We are left to assume that most of the data were qualitative and do not know the process she used to group the reported information. Despite these research-design flaws, her work is of value because it helps us to understand some of the possible similarities between other student teachers and modern-language student teachers with respect to positive change due to training. Furthermore, it includes details on IT modeling placement experiences or lack thereof.

Overall, the studies reviewed in this section offer a glimpse of how various institutions infuse technology into language teacher-training programs. Specifically, four possible models for technology infusion are defined. Then , an example of how to use CMC tools in teacher training is detailed. Finally, approaches to training foreign-language teachers student teachers to achieve computer competency are described. The above are all useful aspects to consider when training TESL student-teachers to use computers, especially because they all focus on a foreign-language teacher-training context. However, more research in this area is required for a deeper understanding of these aspects and other factors for instance identifying, describing and measuring TESL student teachers' computer-training needs.

2.7 The Educational Setting

Not only is it necessary to understand whether modern-language student teachers are similar to other student teachers in terms of their computer-training needs, it is important to consider their educational setting: their teacher-training institution and the schools where they will teach. In Quebec, we are at a changing point in both the ESL and TESL levels of education. For example, the high school program is currently being changed and recently, the elementary curriculum was revised to include an increased use of computers within language learning pedagogy. The new program, like the previous one, embraces the communicative approach, which includes the use of authentic materials within meaningful situations. Not only do computer applications offer many authentic opportunities, but living in the 21st century means that computers are part of many meaningful and authentic situations.

The new Ministry program has three general competencies for primary-level ESL: 1) to interact orally in English, 2) to reinvest understanding of oral and written texts and 3) to write texts (Quebec Ministry of Education, 2001a, p. 98). These competencies are worked on in an integrated fashion so that the students may "acquire the most meaningful learning possible" (p. 99). The description of each competency includes subheadings: meaning of the competency, connections to cross-curricular competencies, contexts for learning, developmental profile, and end-of cycle outcomes for cycle two (grades three and four) and cycle three (grades five and six).

ICT plays a role within each of the three main competencies. In competency 1, to interact orally in English, the Internet is listed as one of the linguistic resources under *Contexts for learning*. In competency 2, to reinvest understanding of oral and written

texts, students have the opportunity to discover English-language culture and in so doing, make use of various media, from books to CD-ROMS, software and Internet sites. While using ICT media to learn more about English culture, students are also achieving a cross-curricular competency: to use ICT. This cross-curricular competency is also developed in competency 3, to write texts, by having students make use of software such as visual and thematic dictionaries, word processors and desktop publishing programs in the writing process. Using ICT is also listed under the *Contexts for Learning* section. Computers can play a role in The *Essential Knowledge* section as well. For instance, the list of learning strategies such as self-monitoring, self-evaluation, planning, use of prior knowledge, practice, resourcing, note-taking, predicting, skimming, scanning, cooperation, and risk-taking can all be developed by using computers. Finally, the last section of the elementary program is titled *Use of Information Communication Technologies.* Here teachers are given guidelines on how to integrate ICT into each competency. Among the 15 examples are "use of computer with one or more partners to carry out various activities; use of interactive CD-ROMs, software and Internet sites to practise spoken English; use of Internet sites for consultation, data gathering and documentary research; publication of information on web pages; and correspondence by email" (Quebec Ministry of Education, 2001a, p. 108). Clearly, ICT is a key component in Quebec learners' study of English.

Furthermore, teacher-training programs have reconceptualized the role of technology; instead of being an objective, it is now a separate competency (#8): "to integrate ICT in the preparation and delivery of teaching/learning activities and for instructional management and professional development purposes" (Quebec Ministry of

Education, 2001b, p. 97). To achieve competency eight, by the end of their training a student teacher must show

> critical judgement regarding the real benefits and limitations of ICT as a teaching and learning resources; demonstrate a general understanding of the possibilities offered by ICT (and the Internet in particular) for teaching and learning, and know how to integrate ICT in a functional manner into teaching/learning activities, when appropriate; use ICT effectively in different aspects of his or her intellectual and professional life: Communication, research, information processing, evaluation, interaction with colleagues or experts, etc; lastly and most importantly, effectively transmit the ability to use ICT to his or her students in order to support the collective construction of learning in a well-structured, critical manner (p. 137).

As described above, the Quebec Ministry of Education (2001a; 2001b) primary and teacher-training programs for ESL and TESL emphasize a commitment to integrate technology into the curriculum. Thus, these future teachers must use an array of technology from CD-ROM applications to internet-based learning in their classrooms. At a recent TESOL convention, in the plenary address, Crandall (1999) stated that TESOL teacher education programs need to offer student teachers opportunities to "become comfortable with various technologies used in language teaching, testing and learning" (p. 21). Despite the increasing interest in using technology in classrooms, there is very little research that focuses on student teachers in Canadian teacher-training institutions or on student teachers who are training to teach languages. More specifically, no study has yet to examine TESL student teachers' needs within the context of the recent Quebec

Ministry of Education (MEQ) revisions and the new student teacher technology competency; this study aims to fill that gap. Given the lack of specific research on TESL student teachers' needs within this recently revised educational milieu, it is imperative to examine what their needs are to effectively use computers in ESL classrooms in Quebec.

2.8 Research Questions

Not only is it necessary to understand the learners' needs, one must also consider their expectations and their educational settings: the university where they train and the schools where they will teach. Naturally, many student teachers hope to acquire the attitudes, modeling opportunities, skills and knowledge which will allow them to use computers in their language-learning classrooms. Similarly, the university teacher-training program and the schools each have their competency requirements. All of these expectations must be harmoniously integrated within the context of the Computers in Language Learning course. To address these expectations, this thesis focuses on two areas: 1) to identify and describe student teachers' computer-training needs in order to facilitate the use of computers in their teaching, and 2) to assess the impact of a needs-based methodology for a Computers in Language-Learning course in meeting these needs.

The research questions are the following:

1) Given that the revised MEQ guidelines include an increased use of computers in ESL pedagogy and that there is a new technology-competency requirement for student teachers, what needs-based training do they require in order to use computers effectively in their teaching?

1a) In order for student teachers to include computers in their teaching, what are their needs in terms of attitude?

1b) In order for student teachers to include computers in their teaching, what are their needs in terms of skills and knowledge?

1c) In order for student teachers to include computers in their teaching, what are their needs in terms of modeling opportunities?

2) What is the impact of a needs-based training methodology for a computers-in-language-learning course on changes in student teachers' self-assessments?

2a) Does using a needs-based training methodology for a computers-in-language-learning course lead to changes in the student teachers' assessments of attitudes?

2b) Does using a needs-based training methodology for a computers-in-language-learning course lead to changes in the student teachers' assessments of skills and knowledge?

2c) Does using a needs-based training methodology for a computers-in-language-learning course lead to changes in the student teachers' assessments of modeling opportunities?

The next chapter describes the methodological approach taken in this research. The It includes the following: design, participants, instruments, data collection procedures and the pedagogical intervention used in this thesis study.

Chapter 3: Research Methodology

3.1 Introduction

This study follows a pre-survey/post-survey design. The pre- and post-surveys examine TESL student teachers' computer-training needs. The intervention between the two surveys, or needs-assessments (NAs) is a required course in the B. Ed. TESL program at the university where the study took place. I taught the course twice, in Winter, 2002 (Study 1, the pilot study), and in Autumn, 2002 (Study 2). During Study 1, the course ran for 13 weeks, one evening a week from 8:25 to 10:15. During Study 2, the course was taught intensively over eight weeks, two afternoons a week from 11:45 to 2:30. In both cases, the course consisted of 60% lecture time and 40% computer lab time. While I was responsible for both the lecture content and lab tasks, a teaching assistant was present during the lab session to provide demonstrations and assistance with the tasks. Although I conducted some of the lab sessions, for the most part, the routine consisted of the following: the group met as a whole for the first 30 to 45 minutes of the class and then was divided into two; each group attended a 45-minute lecture session with me and completed their lab tasks with the teaching assistant for 45 minutes.

3.2 Rationale for Including Two Studies

Study 1 was a pilot study where problematic items in research design and the needs-based training methodology were identified. The results of the pre- and post-NAs were used to make revisions to the above mentioned areas. For example, Study 2 addressed the same research questions with revised measurement tools (see 3.5.7 to 3.5.10)); individual matching from pre to post was used (see 3.5.8); and new qualitative data see (3.5.12) and demographic information (see 3.5.8). were included. Study 2 had a

greater participant retention rate and included tests for significance as well. Changes to the intervention included an improved needs-based training methodology, a smaller student-teacher ratio, better access to computer labs, a more suitable classroom, more teaching time, a different teaching time and format, improved presentation tools and web page, and similar email and chatting platforms (see 3.7).

3.3 Design

This thesis examines one approach toward training student teachers to use computers in language-teaching, namely a needs-based training methodology. This approach uses the student teachers' needs, as well as the needs of the university and the primary and secondary schools, as a framework for the course methodology. The quantitative data document the factors (attitudes, skills, knowledge, course design) as they change from the beginning to the end of the course. The qualitative data offer a context for understanding the numerical data and enrich it by including new information such as descriptions and opinions regarding modeling, self-efficacy and course design. Both quantitative and qualitative data are obtained from the pre- and post-NAs which are designed to address the two research questions. A description of the needs-based training methodology used in the course outlines the intervention between pre- and post-NAs. This description incorporates my personal teaching philosophy, the materials used in the course and some literature on syllabus design.

3.4 Participants

The participants in Study 1 and Study 2 were student teachers in a computers and language-learning course (TESL 330), which is a required component of the university TESL teacher-training program. In Study 1 (Winter, 2001), there were 45 student teachers. Most student teachers were in a four-year Bachelor of Education TESL degree program, while a few people were in a one-year, post bachelor's, TESL-certificate program. The majority of the student teachers had just finished their first-year, primary-school internship.

In Study 2 (Autumn, 2001), the pre-NA included six new questions which provided additional demographic information. Thus we know there were six males and 18 females; their ages ranged from 21 to 60 with the majority of them (16) between 21 and 30 years old. Six student teachers reported speaking three or four languages well, 13 reported speaking two languages well, and three said they spoke one language well. Twenty of the student teachers were in a four-year Bachelor of Education program, while two people were in a one-year, post-bachelor, TESL-certificate program. Most student teachers had a preferred level to teach: nine chose adult education, six selected primary-school, three indicated high-school while four had no preference. The majority of the student teachers had not yet completed an internship, but were scheduled to do so immediately after the course.

3.5 Instrumentation

3.5.1 Study 1 and Study 2: Introduction.

For Studies 1 and 2, a pre-course NA (see Appendices A & C, pp. 125, 129) and a post-course NA were designed and administered (see Appendices B & D, pp. 127, 132); both surveys were completed anonymously during the course. The pre- and post-, self-report NAs contain items that are quantitative (sections one and two) and qualitative (section three). Sections One and Two are identical for the pre- and post-NAs, while the open-ended questions in section three are different. An additional section, section LL, is included on the post-NA as well (for more details, see 3.5.6).

3.5.2 Study 1 and Study 2: Origin of the Needs-Assessment Items.

Similar to Fisher (2000) and Whetstone and Carr-Chellman (2000), both the pre- and post-NAs were created with the help of faculty and existing surveys. Like Fisher, the development of the instrument was completed in four stages. An initial list was compiled of current computer competencies and issues such as attitude among student teachers. The list was revised according to the course syllabus, the MEQ guidelines and the researcher's own resources.

Both Delcourt and Kinzie (1993) and Fisher (2000) examined attitude on their surveys with statements and Likert-scale responses. Delcourt and Kinzie used 19 attitude statements such as "I feel comfortable about my ability to work with computer technologies." (p. 35). These types of statements are consistent with the two attitude measures in Section One of the pre- and post-NAs. However, Delcourt and Kinzie also equally balanced their items by using positively and negatively worded statements. In a

survey by Fisher (2000), attitude was also assessed with 25 statements, both positive and negative, such as "I feel apprehensive about using a computer." (p.115).

Many of the computer competencies investigated in this thesis (18 in Study 1 and 19 in Study 2) in Section Two of the pre- and post-NAs can be found in previous surveys. For example, Fisher (2000) also included statements about using word-processing, spreadsheets, the Internet, email, and presentation software on her questionnaire. Whetstone's and Carr-Chelleman's (2000) survey listed these five items, as well as content-area software, which is also part of the pre- and post- NAs. Delcourt and Kinzie (1993) measured self-efficacy with 25 items: ten reflected word-processing, nine were on electronic mail and six focused on CD-ROMs. Russell, Finger and Russell (2000) made a distinction between basic and advanced computer skills. Of the 13 items on their advanced list, five (using spreadsheets, email and the Internet; searching the Internet and building a web page) match the skills in Section Two of the pre- and post-NAs. Finally, Ropp's (2001) proficiency measure is a list of 20 items related to email, Internet and software applications. Like Section Two in the pre- and post-NAs, the surveys mentioned above measured skill items with Likert scales.

Section LL on the post-NA combines pedagogical topics on the syllabus, such as teaching special populations, collaborative learning and lesson planning with computers in language-learning situations. The rationale for this section is based on the researcher's teaching philosophy: for student teachers to use computers effectively in their future classrooms, they must able to integrate their knowledge of pedagogical topics with computers in language-learning situations. The Ministry of Education (2001a) uses the same integration rationale in its student competencies at the primary and secondary

levels: the technological skills are not listed as separate competencies but as skill items within the three main language-learning competencies. Although none of the surveys reviewed here measured pedagogical topics as they apply to computers in language-learning, two surveys did include a list of competencies within a teaching context. Whetstone and Carr-Cellman (2000) had student teachers self-rate eight skill items based on the following question: "Which of these do you feel prepared to use in your future classroom?" (p.16). Kemp (2001) listed all 30 skills within a teaching context: "My education has prepared me to use, evaluate and recommend educational software for teaching in my subject area." (p. 40) or "I can use the Internet in an informed manner and critically evaluate the information it provides for use in teaching in my subject area." (p. 41). The latter two statements integrate the computer competency with the subject pedagogy.

Many of the questionnaires in the reviewed literature did not contain any open-ended questions. In contrast to the reviewed literature, Section Three, the last section, on the pre- and post- NAs included four (post) to five (pre NA) open-ended questions in order to gather qualitative data and in turn, better address the research questions. In fact, Savenyne's (1993) Computer Literacy Attitude Survey contained both open-ended and Likert-scale items. Whestone and Carr-Chelleman (2000) also varied their format by asking student teachers to explain some of their responses on the survey. Kemp's (2001) survey on teacher education has three open-ended questions at the end: "How can teacher education programs better prepare teachers to use technology?"; "What kind of computer ... technologies should be included in teacher education ...?"; and "What is needed to ensure that all beginning teachers have the expected levels of ... competence

for infusing technology in their curriculum?" (p. 43). While Whestone and Carr-Cellman sought explanations for the participants' quantitative choices, Kent targeted student teachers' opinions; Section Three is designed to do both of these things. Finally instead of short open-ended questions to examine attitude, Watson (1997) had student teachers write two-paragraph responses. This option was chosen for another measurement tool which is discussed in section 3.5.12 below. Using open-ended questions and paragraph descriptions for measurement purposes enrich the quantitative data.

3.5.3 Study 1: Sections One and Two of the Pre- and Post-NAs.

Section One[1] includes four quantitative items which focus on computer skills and attitudes; student teachers rated themselves on a four-point scale ranging from *very positive* or *excellent* to *negative* or *below average* (See Appendices A and B, pp. 125, 127). Section Two includes 18 quantitative items which focus on computer skills and knowledge (See Appendices A and B, pp.125, 127). Some examples of skill items are using spreadsheets, using presentation software, finding language-learning resources on the Internet, using email, while an example of a knowledge item is understanding how computers work. In this section, student teachers rated themselves on a five-point scale ranging from 1 (*excellent* or *extremely important*) to 5 (*non-existent* or *not important at all*). Note that on the 18-item list, the student teachers rated themselves under two different headings: *My Knowledge/skills* and *Should be covered in the* course. The first column is a self-report of the student teachers' computer knowledge and skills, while in

[1]All the titles (Section One, Section Two, Section Three, Section LL) are included on the NAs in appendices for clarity, but these titles were not on the original NAs.

the second column student teachers assess how important it is to include these 18 items in the course.

3.5.4 Study 1: Section Three of the pre-NA.

To provide qualitative information Section Three includes five open-ended questions (see Appendix A, p. 126). Since most of the student teachers have completed an internship, the questions focus on the computer technology in their placement schools, opportunities to observe their cooperating teachers modeling technology, concerns and/or suggestions regarding the course.

3.5.5 Study 1: Section Three of the post-NA.

Section Three on the post-NA includes four open-ended questions (see Appendix B, p. 124). The post-course questions examine possible changes in opinion regarding the use of computers in language-learning, ways student teachers might use computers in language-learning, as well as suggestions on how to improve the course.

3.5.6 Study 1: Section LL of the post-NA.

The post-NA includes a new section (Section LL, see Appendix B, p. 128) with 13 items. In the pre-NA, section two focuses on topics related to computers, whereas this new section focuses on pedagogical applications within computers and language-learning situations. By including this new section with items specific to general and language-learning pedagogy (e.g. *understanding technical requirements within computers in language-learning, creating effective activities within computers in language-learning*

situation), I gained a better understanding of whether my students felt they were able to apply their pedagogical knowledge and skills to teaching contexts where computers play a role in language-learning. As in Section Two of the pre- and post-NAs, student teachers rated themselves on a five-point scale ranging from 1 (*excellent* or *extremely important*) to 5 (*non-existent* or *not important at all*). As in Section Two of the pre- and post-NAs, the student teachers rated themselves under two different headings: *My Knowledge/skills* and *Should be covered in the* course. The first column is a self-report of the student teachers' pedagogical knowledge and skills within computers in language-learning situations, while in the second column student teachers assess how important it is to include these 13 items in the course.

3.5.7 Study Two: Introduction.

The pre-course NA and the post-course NA used in Study 1 were revised and administered in Study 2 (see Appendices C and D, pp. 129, 132); both surveys were completed anonymously. Both self-report NAs contain quantitative (Sections One and Two) and qualitative items (Section Three). Sections One and Two are identical for the pre- and post-NAs, while the open-ended questions in Section Three are different. An additional section (section LL), is included on the post-NA, as well. Revisions to the NAs were made for the following reasons: to facilitate the data compilation, to clarify some of the survey items, to include participant feedback from Study 1, and to incorporate changes in the methodology.

3.5.8 Study 2: Revisions to the Pre-NA

The most important change to the pre-NA was a cover sheet which asks for demographic information on gender, mother tongue, number of languages spoken, age. program, future teaching intentions, and a code name. The demographic information allows for a more detailed description of the student teachers while using code-names allows for individual matching from pre to post, an option which was not possible with the first set of data. The other new item was a question in the pre-NA: *Have you completed a placement? If yes, please answer the two questions below.* The extra question helped to clarify how many student teachers could actually answer the subsequent questions related to describing the computer-technology and modeling opportunities in their placement schools.

3.5.9 Study 2: Revisions to the Post-NA

The two revisions to the post-NA included highlighting key words and changing the order of presentation. Key words in two open-ended questions in Section Three were highlighted. For instance, **WAS** and **HAS CHANGED** were bolded and capitalized to help student teachers focus on possible opinion changes before and after the course. The order of presentation was changed in two places in Section LL. to reflect the actual order in which the material was covered in the course.

3.5.10 Study 2: Revisions to the Pre- and Post-NAs

The three revisions to the pre- and post-NAs included the numbering of items, introducing a new item and defining certain words. All items in each section were

identified with numbers or letters to facilitate the data compilation. *Assessing TESL resources on the Internet* was the new item included in Section Two; the ability to assess these types of resources was a skill covered as a separate item in the needs-based training methodology and therefore merited its own place on the survey. To better define certain items, additional wording was used in Section Two. For example, the item *using news groups* in the first study was revised to include a definition: *using news groups (a group of people share emails on a specific topic).*

3.5.11 Another Survey Instrument for Studies 1 and 2: The Post-Internship Survey for Computers in Language Learning.

This measurement tool was designed to survey the student teachers who had taken the computers in language-learning course and had just completed a four-week school placement. The survey (see Appendix E, p. 134) had two main goals. First, it represented an opportunity to see if student teachers had observed their most recent supervising-teachers model the use of computers in language-learning. Second, it provided information about whether they used computers in their own teaching and if so, how they used them. The format and content of the survey were similar to the pre- and post-NAs. There was no new content although some of the open-ended questions were revised slightly to include concrete examples.

There are three sections on this survey. The first section requires student teachers to identify when they completed the course and if they completed the course in Autumn 2001, to also include their nickname. The second section was identical to the first section of the pre-NA. Here, student teachers rated their attitudes toward computers

and their skill level. In the last section there were six open-ended questions which focused on describing the computer technology in their placement schools, possible modeling opportunities, how they may have used computers, whether they intended to use computers in their future teaching and if so, how.

3.5.12 A Descriptive Instrument for Study 2: Self-Assessments

Two days after the course ended, all the student teachers handed in their final assignment: a self-assessment. The Self-Assessment was a two-paragraph email where the 24 student teachers evaluated their participation in the lectures, lab and group work. This assignment was introduced in the *Evaluation* section of the course outline (see Appendix F, p. 136) on the first day of class. The introduction also included six self-assessment guidelines which are part of the *Student, TA and Teacher Responsibilities* section of the course outline (see Appendix F, pp. 136). Examples of three of these self-assessment guidelines are *Be prepared to self, peer and teacher evaluate; Embrace the potential of using computers in your LL* and *Hand in well-presented, creative and intelligent work on time.*

3.6 Data-Collection Procedures

3.6.1 Introduction.

This section describes the data collection procedures for the pre- and post-NAs in Study 1, which are compared to the procedures in Study 2. The data collection for the

Post-internship Survey for Study 1 and Study 2 is also outlined. Finally, details regarding the collection of anecdotal evidence are included.

3.6.2 Data-Collection Procedures for Study 1.

Student teachers in Study 1 completed the pre-course NA in December. The student teachers had just finished their first internships and were in class for their final, wrap-up session. I identified myself as their future Computers in Language-Learning teacher and asked them to fill out the pre-NA so that I could use the information to prepare my course. They had fifteen minutes to complete the pre-NA, which did not ask them to identify themselves by name or number.

The post-NA was distributed at the end of the Computers in Language-Learning course, during the last class meeting. The students were told that it was similar to the pre-NA, but that it also included an extra section about computers and language-learning methodology, as well as some open-ended course-feedback questions. Again, they had fifteen minutes to complete the post-NA, which did not include any type of individual-participant coding.

3.6.3 Data-Collection Procedures for Study 2.

Student teachers in Study 2 completed the pre-NA for homework and handed it in during the second class meeting of the Computers in Language-Learning Course. I asked them to complete the NA so that I could use the information to personalize the course based on their answers. I suggested that they spend twenty minutes on the NA, which

included a section where they had to choose a nickname so individuals could be matched from pre to post.

The data-collection procedure for the pre-NA was modified in Study 2 for two reasons. First, my sense of some of the Study 1 data is that the student teachers did not have enough context to answer certain items (e.g. *using language-learning software, using news groups, setting up a discussion board*) since the course had not yet begun. I predicted that attending the first full class would give the student teachers a better understanding of the course content and some context which allowed them to offer more informed responses. Second, as a homework task, the student teachers were able control when and how long they wish to spend on the pre-NA.

The post-NA was distributed during the last class of the course. The student teachers were told that it was similar to the first survey, but that it also included an extra section about computers and language-learning methodology, as well as some open-ended course-feedback questions. They had twenty minutes to complete the survey, which required them to include their chosen nicknames. The teaching assistant was present to help the students recall their nicknames, if necessary. They were told that the teaching assistant was not involved in my research and would not reveal their true identities to me.

3.6.4 Data Collection Procedure for the Self-Assessments in Study 2.

On November 2, 2001, the 24 student teachers who completed the course handed in their Self-Assessments. The assignments were graded following the evaluation criteria included on the course outline (explained in section 3.5.12). They were then reread for

the purpose of this thesis. While rereading, the researcher identified comments which revealed changes in three areas: attitude, knowledge and/or skills. Eleven of the student teachers' texts reflected change in one or all of these areas. Since these areas were directly linked to research questions 1a, 1b, 2a and 2c, their Self-Assessments were retained for analysis. The comment-selection procedure is discussed in section 4.3.7.

3.6.5 Data-Collection Procedures for the Post-Internship Survey for Studies 1 and 2.

In December, 2001, some of the student teachers from Study 1 and Study 2 had just completed their first or second school placement. These student teachers were part of a primary-school or high-school practicum course. Both professors had scheduled 'wrap-up' sessions in early December, during which I was given permission to survey their student teachers. I went to each classroom and identified all the student teachers who had completed either of the Computers in Language-Learning courses so they could complete the Post-Internship Survey. They were told that it was a follow-up survey to provide information about whether they had had the opportunity to use computers in their placements and to see whether they planned to use computers in their future teaching. They had ten minutes to complete the items. Student teachers from Study 1 did not include any identification, while student teachers from Study 2 wrote down their chosen nicknames. A list of these names was provided in each classroom for those who needed a reminder.

3.7 The Needs-Based Training Methodology: A Rationale and Description

A needs-based training methodology uses the learners' needs and competencies, the objectives and setting of the teaching institution, as well as the learning goals and resources within the primary and high schools to guide the teaching and course content. In fact, many good pedagogues weave their students' needs and the expected outcomes into the fabric of their course. This process does not occur within a vacuum, for the educational milieus must be taken into account.

In this methodology, learners' needs are assessed through a needs analysis (Nunan, 1990; Valdez, 1999). Nunan and Lamb (1996) believe that program design begins with the goals and objectives which are determined by a need analysis (in Valdez, 1999). Within this teaching philosophy, "learner-centered curricula is incorporated into all stages of the curriculum development process" (Nunan, 1990, p.17). Valdez (1999) offers examples of assessment which include standardized tests, interviews with learners, learner observation, and consultations with other experts in the field. In this thesis, the assessment tools include the pre- and post-NAs, the Post-Internship survey, the Self-assessments, as well as consultations with other professors who have taught similar courses. An effective needs assessment can identify useful information, such as the learners' knowledge and skill levels, objectives, concerns and background (Valdez, 1999). The results of the needs assessment are used to inform and modify syllabus design: "The strength of a syllabus based on students' needs first and foremost starts from where the students are and builds on their knowledge and experiences" (Valdez, 1999, p. 31).

In the case of the Computers in Language-Learning course, the needs-based training model is of particular value because training student teachers to use technology is a relatively new phenomenon, especially in the area of language-learning, and so the interplay of the key factors may not be transparent to teacher-trainers. For example, because many elementary, high school and teacher-training institutions have only recently begun to include the use of ICT (information and communication technologies), information about how to teach and assess is still in its beginning stages. Moreover, the use of ICT in education requires student teachers to acquire innovative skills and innovative attitudes.

The application of the needs-based training model to the Computers in Language-Learning course is best described through its activities and materials. The teaching assistant and I offered activities such as lectures, demonstrations, computer sessions, assignments, as well as readings, and provided opportunities for discussions, group work, tutorials, computer-lab tasks and 'hands-on' skill development. Two of the basic, yet key, materials were the course outline (see Appendix F, p. 136) and course syllabus (see Appendix G, p. 140). For instance, in the course outline, the university teacher-training, competencies for using ICT were listed in the *General Objective* and *Specific Objectives* section. The *Content* segment addressed the student teachers' skill and knowledge needs. The *Methodology* and *Student, TA and Teacher Responsibility* sections described the approach, which includes skill acquisition, formative evaluation, assessment methods, individual goal setting, collaboration, regular attendance, variety, and aspirations to quality. Finally, the *Evaluation* sections listed assignments and exams; these evaluation tools served to target the student teachers' needs as well as the MEQ competencies for

using ICT in ESL programs at the primary and high school levels. While going over these two sections with my learners in the first class, attempts were made to convey a non-judgemental, reflective, creative and hands-on approach to learning in hopes of reducing any feelings of computer anxiety or negative attitudes toward technology. The course syllabus may have also helped to reduce anxiety and fears of the unknown as it detailed the activities to be covered in each teaching session.

A visit to the course web page offers a clearer vision of how the learners' needs are targeted (available at: http://artsandscience.concordia.ca/tesl330 or see Appendix H, p. 143). Here the student teachers accessed detailed explanations of some lab tasks (see Appendix I, p. 144, for one example), all assignments (see Appendix J, p. 146, for one example), samples of exemplary work (see Appendix K, p. 149, for one example) and their marks (see Appendix L, p. 153). The information regarding the assignments helps to clarify the expected outcomes, while the samples offer models of how others have integrated computers into their language teaching.

Offering models to students also provided a clear example for those who are unable to imagine the final outcome because using computers in language-learning is unfamiliar territory for them. Seeing their exemplary work published not only motivates the student teachers, but it shows them how to use this technique in their own classrooms. Examples of student teachers' published work can be found by clicking on Lesson-Plan Models, Management Tips, Great TESL and ESL Sites, and Midterm-Exam Questions (see Appendix M, p. 154, for one example). In fact, the web page is in itself an ideal model because it allows the professor to teach with the Internet and the students to learn on-line. Other approaches to positive role modeling include incorporating presentation

software, the Internet, the course web page and word-processing into the lectures; using spreadsheets for marking and attendance; assigning work which requires learning about and using computers; verbalising my pedagogical decisions on how to use computers in language-learning; reading and discussing computers and language-learning pedagogy such as management, collaboration and competency development.

Many of us learn best by seeing and doing, and this is why it is essential for student teachers to have access to as many role models as possible. However, besides word-processing and two key pal projects, it is unlikely that other professors within this department modeled technology in their teaching during the terms of Winter, 2001 and Autumn, 2001. As will be shown in the results section under *Modeling Opportunities*, these student teachers are also not likely to observe their supervising teachers use technology. To improve this situation, the teaching assistant and I gave demonstrations and opportunities for hands-on skill acquisition in a lab setting. Furthermore, the course syllabus (see Appendix G, p. 140) included a variety of model guests: second-language teachers who use computers, people who make and sell software for language-learning, and a librarian who uses databases for research. The detailed lecture-by-lecture syllabus also helped the student teachers to see the knowledge and skill progression within the course. Thus, the needs-based training methodology, the intervention, provided a model for a computers in language-learning course which considered the teacher-training institution, the schools where the student teachers will teach and, most importantly, their needs.

As for the evolution and revisions to this methodology, as a teacher, the idea of how to teach the course came to me first. Then as a researcher, I decided to examine the

effectiveness of this idea with needs measurements. Both the methodology and analysis were initially refined in consultation with key literature in the field, my supervisor and other teachers who had taught the course. The results of the pre- and post NAs from Study 1 were used to further refine this teaching technique (for a description of these revisions see 3.2). This process, the methodological revisions from Study 1 and Study 2 as well as the results from both studies were used to make recommendations for training student teachers, including the specific methodology, and future research (see 5.3.4, 5.4 and 5.5).

Chapter 4: Analysis and Results

4.1 Introduction

Quantitative and qualitative data were collected in both Study 1 and Study 2. Quantitative measurements included the student teachers' self-reported 1) general attitudes towards and skills in the use of computers in general and as applied to language-learning (Items 1 to 4, Section One), 2) level of computer skill and knowledge (Items 5 to 40/42, Section Two) and 3) opinions regarding the inclusion of certain topics in the course content (Items 5 to 40/42, Section Two). Self-assessment of student-teacher ability as applied to general and language-learning pedagogy and the use of computers within this context was measured in Section LL of the post-NAs. Items 1 to 4 on the pre- and post-NAs were ranked on a four-point Likert scale, while all other items used a five-point Likert scale.

Sources of qualitative data for Study 1 and Study 2 consisted of responses to five open-ended questions in the pre-NAs, four open-ended questions in the post-NAs and the Post-Internship Survey. The focus of the analysis of the Post-Internship Survey was Question 8, in which student teachers were asked to describe the modeling opportunities, or lack thereof, in their recently completed placement. Other items from this survey are not reported[2]. Study 2 included additional qualitative data in the form of Self-Assessments of learning progress throughout the course provided by 11 student teachers.

4.2 Exclusions

In Study 1, 45 of 50 (90%) student teachers completed the pre-NA while 31 of 50 (62%) completed the post-NA. As this pilot study was exploratory in nature, all student

[2] Because of the amount of data gathered from the study instruments, only one item on this survey was analysed. Item eight was selected as it addressed the modeling-opportunities research question.

teachers' NAs were retained regardless of the completeness of the data. However, two student teachers were excluded from the analysis of Section LL on the post-NA as these student teachers failed to provide any responses to this section. There was varied response by the student teachers to the qualitative data items on the NAs in Study 1. Thus the sample size for analysis of the qualitative data items varied.

In Study 2, 24 out of 25 (96%) student teachers completed both the pre- and post-NAs. The exclusion process used in Study 2 was more rigorous than that of Study 1. Stricter participation-retention guidelines aimed to ensure the matching of individual pre- to post-NAs in order to permit statistical testing of the data. Incomplete data were obtained from two student teachers, these student teachers were therefore excluded from the study. Study 2 had a resulting sample size of 22 participants. The majority of these student teachers provided complete qualitative data.

The Post-Internship Survey was conducted after student teachers completed a placement. A convenience sample was taken from among the student teachers of both Study 1 and Study 2. Of the 34 student teachers present from Study 1 and 2, all (12 from Study1 and 22 from Study 2) agreed to complete this survey and were therefore included in the analysis of these data.

4.3 Analysis Procedures

4.3.1 Introduction.

Although minor modifications were made to the NAs used in Study 2 based on the pilot testing of the instruments in Study 1, procedures for data analysis were similar for both studies. The sole important difference between the two studies in terms of the

quantitative analysis was the use of paired, within-student comparison of the pre- to post-NAs in Study 2. This allowed for statistical testing, using T-Test procedures, of the difference between the pre- and post-course scores of all the quantitative data obtained from the NAs of Study 2. Analysis of quantitative data included the calculation of mean and median scores, pre- to post-course differences and pre- to post-course percentage change in mean scores for each item included on the NAs. Pre- to post-course differences could not be calculated for Study 1 as pre and post participation rates varied, and individual student-teacher pre- and post-NA responses could not be linked. Qualitative data were analysed using a method of recursive reading and subsequent categorization of the student-teacher provided responses.

4.3.2 Scoring Methods for the Quantitative Data.

Section 1 of the pre- and post-NAs included four items, scored on a four point scale: two of the four items ranged from 'very positive' to 'negative' while the other two items were ranked as 'excellent' to 'below average'. 'Very positive' and 'excellent' were coded as one, 'positive' and 'good' were coded as two, 'neutral' and 'average' were coded as three, and 'negative' and 'below average' were coded as four. Section Two of the pre- and post-NAs included 18 (Study 1) or 19 (Study 2) items ranked on a five-point Likert scale under two different headings. Items assessing the student teachers' rating of their own computer knowledge and skill were coded as follows: excellent (1), good (2), average (3), below average (4) and non-existent (5). The same items, when used to measure the student teachers' opinion of course content, were coded as extremely important (1), very important (2), important (3), not very important (4), and not important

at all (5). The 13 items included in Section LL of the post-NA were organized, worded and coded as in Section Two of the NA.

4.3.3 Coding Methods for the Qualitative Data.

Qualitative data were obtained from the student teachers' responses to Section Three of the pre- and post-NAs, question eight of the Post-Internship Survey and the Self-Assessment (Study 2 only). These data were grouped into categories. Similar to Kamhi-Stein's (2000b) analysis of transcripts from taped interviews with student teachers and Watson's (1997) paragraph coding, emerging categories were identified based on the provided responses rather than the assignment of data to a predetermined classification system. A process of recursive reading was used to identify responses that recurred in each open-ended question (see Open Coding: Strauus & Corbin, 1990, in Kamhi-Stein, 2000band in Watson, 1997). Similar responses were then grouped into a tentative classification system (axial coding: Strauss & Corbin, 1990, in Kamhi-Stein, 2000b) so as to identify the salient themes that emerged. To validate this procedure, the ungrouped, original responses were assigned to the developed classification system by a second reader. With the exception of one category, the second round classification of data resulted in identical assignment of responses to the developed groups.

4.3.4 Coding Methods for the Qualitative Data on the Pre Needs-Assessment in Study 1 and 2.

The qualitative data in Section Three of the pre-NAs were grouped into categories. The first open-ended question in the pre-NA asked student teachers to describe the computer technology in their placement schools (number of computers in the

school, classroom, and lab, computer type, age and power, available software and Internet access). Initially, the responses fell into three emergent categories: 'adequate', 'inadequate', and 'little or no information'. The 'little or no information' category included all responses with insufficient information for an 'adequate' versus 'inadequate' distinction. 'Inadequate' was operationalized as responses which indicated very little technology access in the placement school. However, the assignment of responses to either the 'inadequate' or 'adequate' category became problematic as few student teachers provided complete, detailed information that would permit an 'adequate' versus 'inadequate' classification. Thus, the 'adequate' and 'inadequate' distinction was replaced with a 'sufficient information' category which included all responses that gave enough information for a clearer picture of the placement-school situation.

The second open-ended question in the pre-NA examined modeling opportunities and was phrased as follows: "Have you heard about, tried or worked with a teacher who has used computers in language learning? If so, please describe the activities." After the initial *yes* versus *no* division, the observed activities reported by the student teachers who had responded positively included the categories: Internet, software, publishing, word-processing, spread sheets or other. The final category allowed for comments such as "Computers used as rewards for good behaviour." The next question addressed student teachers' concerns about the Computers in Language-Learning course. Concerns were related to four areas: expressing anxiety or a negative attitude ("I fear falling behind or computers sometime scare me."), having a low skill level ("I have little knowledge of how to use computers."), having computer-access concerns ("Will we have access to a lab at anytime?") or worrying about the course-content ("I want the course to focus on

how computers can be used in teaching."). The fourth item requested suggestions regarding course content, methodology and evaluation. The responses were grouped into three areas: general methodology suggestions (*"Don't skip the easy stuff."*) and suggestions related to either Internet ("Internet should be an important part of the course.") or software use ("Spend time on evaluating language-learning software.").

4.3.5 Coding Methods for the Qualitative Data on the Post-NA in Study 1 and 2.

The first question of the post-NA had student teachers describe their opinion on using computers in language-learning before they took the course. The responses were categorized as positive ("I wanted to use computers in ESL."), negative ("I thought they made the teacher lazy."), a mixture of both ("I was open to the idea, but sceptical.") or no opinion at all ("never thought about it"). In the next question, student teachers were asked to explain their present opinion and how it had or had not changed. The answers were classified as no change ("not really"), no change still positive ("I feel more confident about using computers in LL."), positive change ("Now I know how to use computers to teach."), negative change ("They are used way too much."), mixed change ("I see them as useful, but cumbersome and at times inefficient.") and unknown change. The last category includes comments such as "it changed a little, yeah" where it was not possible to determine whether the change was positive or negative.

The remaining question used in the qualitative analysis assessed the student teachers' future teaching intentions. Responses to the question divided students into three groups: those who intend to use computers in their teaching, those who are not sure, and those who think they will not. Among those who responded positively to the use of

computers in their future teaching, the specific activities listed were classified as either Internet, key palling or software.

4.3.6 Coding Methods for Qualitative Data on the Post-Internship Survey in Study 1 and 2.

As noted in section 4.1, one item, question eight, from the Post-Internship Survey was analysed. The question required student teachers to state whether they had seen their supervising-teacher use computers in language-learning and if so, how. Once the *yes* versus *no* division had been made, two categories emerged. There were those teachers who modeled the use of computers in the actual classroom with students ("My teacher had students key pal.") versus those who used computers outside of the classroom ("She used Excel to calculate her grades.").

4.3.7 Coding Methods for Qualitative Data on the Self-Assessment in Study 2.

The Self-Assessment was a final assignment for which the student teachers were requested to complete a short, narrative email in which they assessed their course participation (explained in section 3.5.12). To analyse this information, a specific-level descriptive reporting technique was used rather than a medium or general level description. "Specific description is reported by means of rich, concrete narrative vignettes... it gives finely nuanced details... and clarifies the meaning of key analytic constructs" (Erikson, 1991, p. 346).

The self-assessments provided by 11 of the 24 student teachers who completed the course were chosen based on the most salient of the comments related to two research questions: change in attitude towards computer use, and improvement in computer

knowledge and skill level. The following comment is an example of information related to these two research questions: "When I first started this course, I had a lot of anxiety... this course has given me the chance to learn at my own pace and quell the panic of using computers."

4.4 Results

4.4.1 Descriptive Quantitative Data for Study 1.

Student teachers' attitudes, skills and knowledge with respect to the use of computers in general and as tools in language-learning were measured quantitatively on both the pre- and post-NAs. The information in the tables below serves to highlight trends in the pilot-study data . The data analysis and results of Study 1 are limited however, by the lack of student-identification codes, which made data linkage of individual student-teacher pre- and post-course NAs impossible. Due to this methodological limitation, direct, within student-teacher-comparison and statistical testing of the differences between pre- and post-NA scores could not be conducted. This methodological limitation must be kept in mind while interpreting the data. For this reason only descriptive results, including mean and median scores, and percentage change from pre- to post-NAs, are reported in Tables 1 to 3. Forty-five and 31 student teachers completed the pre- and post-NAs respectively.

Table 1 illustrates student teachers' self-assessment of computer attitude and skill, both in general and applied to use in language learning, as measured by the first four items on the pre- and post-NAs. For each question, the participating student teachers

were asked to rate their attitude or skill on a four-point scale, where lower scores represented higher skills or positive attitudes and higher scores indicated lower skills or negative attitudes. As shown by the mean scores, the post-NA student teachers reported a more negative attitude towards computers in general (Item 1) than those student teachers who responded to the pre-NA. There was no change in self-reported attitude towards the use of computers in language learning (Item 3). A higher level of self-rated computer skills (Items 2 and 4) was noted among the student teachers who completed the post-NA in comparison to those who participated in the pre-NA. Median scores changed by one scale point, from *average* (3) to *good* (2). These last two results are promising indicators of the potential for the needs-based methodology to contribute to positive change in student teachers' skills and knowledge.

Table 1: Mean Pre- and Post-Course Scores and Percentage Change[3] on Items Measuring Computer Attitude and Skills in Study 1 (Pre N = 45, Post N = 31)

NA Item and Measurement	Mean	S.D	Median
Item 1 - Attitude toward the use of computers in general			
Pre-course	1.93	0.78	2
Post-course	2.16	0.82	2
Percentage Change	12%†	--	--
Item 2 - Computer skill & knowledge in general			
Pre-course	2.6	0.84	3
Post-Course	2.35	0.75	2
Percentage Change	10%	--	--
Item 3 - Attitude toward the use of computers in LL situations			
Pre-course	2.22	0.79	2
Post-Course	2.23	0.88	2
Percentage Change	0%	--	--
Item 4 - Computer skill & knowledge in LL situations			
Pre-course	3.19	0.96	3
Post-Course	2.42	0.72	2
Percentage Change	24%	--	--

Note: The four items have a possible range from one to four, where one is *excellent* or *very positive*, and four is *negative* or *below average* (Section One on the pre- and post-NAs, Appendices A and B).
†: The change from pre- to post-course NA scores was in the negative direction for Item 1.

Table 2 illustrates the student teachers' self-assessment of their computer skills and knowledge in general, as measured by the 18 items in Section Two on the pre- and post-NAs. For each question, the participating student teachers were asked to self-rate their skill or knowledge based on a five-point scale, where lower scores represented higher skills or knowledge and higher scores indicated low skills or knowledge. The mean and median pre-scores for the 18 skill items indicate that the student teachers began the course with *average* to *below average* (*average* = 3, *below average* = 4, *non-existent* = 5) skills and knowledge. The mean computer skill level among student teachers who participated in the post-NA was *average* (*average* = 3, *good* = 2, *excellent* = 1).

[3] For Tables 1 and 2 as well as 4 to 9, percentage change from pre to post assessment was calculated using the following formula: ((pre-course mean – post-course mean)/pre-course mean)*100.

Table 2: Mean Pre- and Post-Course Scores and Percentage Change for the 18 Skills and Knowledge Items in Study 1 (Pre N = 45, Post N = 31)

NA Item and Measurement	Mean	S.D	Median
Overall Skills & Knowledge			
Pre-course	3.25	1.34	3
Post-Course	2.83	1.27	3
Percentage Change	13%	--	--

Note: The four items have a possible range from one to four, where one is *excellent* or *very positive*, and four is *negative* or *below average* (Section One on the pre- and post-NAs, Appendices A and B).

Table 3 shows the student teachers' self-assessment of their pedagogical skills and knowledge, as applied to the use of computers in language learning situations. This assessment was conducted only at the end of the course and included the 13 items in Section LL of the post-NA. For each question, the participating student teachers were asked to self-rate their skill or knowledge based on a five-point scale, where lower scores represented higher skills or knowledge, and higher scores indicated lower skills or knowledge. After course completion, the student teachers' mean and median scores were slightly better than *average* or *average* (*average* = 3, *good* = 2).

Table 3: Mean Post-Course Scores for the 13 Skills and Knowledge Items as Applied to Language-Learning Situations in Study 1 (Post N = 29)

NA Item and Measurement	Mean	SD	Median
Overall Skills & Knowledge			
Post-course	2.86	0.9	3

Note: The 13 items have a possible range of one to five, where one is *excellent* and five is *non-existent* (Section LL of the post-NA, Appendix B). Two student teachers did not complete Section LL, leaving a sample size of 29 for this analysis.

The results presented in Tables 1 to 3 indicate that pre-course attitudes towards computers were generally positive. A slightly less favourable attitude towards the use of computers in general was noted among the student teachers included in the post-NA. In

contrast, higher levels of computer skills and knowledge in general and as applied to language-learning situations were reported by the student teachers included in the post-NA when compared to those in the pre-NA. The results indicate that the student teachers' pre-course computer skills and knowledge level was below *average* and therefore training in this area was required to meet Ministry of Education competence criteria. Positive change in the post-course mean score suggests a positive association between the needs-based training and the level of computer skills and knowledge of the participating student teachers.

4.4.2 Descriptive Quantitative Data for Study 2.

In Study 2, 22 student teachers, individually matched from pre- to post-course, completed both the pre- and post-NAs. Student teachers' attitudes, skills and knowledge with respect to the use of computers in general and as tools in language-learning in particular were measured quantitatively on both the pre- and post-NAs. The information in the tables below serves to highlight trends in the Study 2 data . Since each individual skill or knowledge result does not provide enough observations to conduct tests of significance, only descriptive results including mean and median scores, and percentage change from pre- to post-NAs are reported in Tables 4 through 11 (for tests of significance on the overall scores for skills and knowledge items see 4.4.3). Tables 4 to 9 refer to the student teachers' self-reported ability-ratings regarding attitudes, skills and knowledge related to the use of computers in general. Tables 10 and 11 illustrate post-scores for 13 pedagogical items as applied to using computers in language-learning situations.

Table 4 presents the student teachers' self-assessment of computer attitude and skill, both in general and as applied to use in language learning. For each of the four questions included in Section One of the pre- and post-NAs, the student teachers were asked to rate their attitude or skill based on a four-point scale, where lower scores represented higher skills or more positive attitudes and higher scores indicated lower skills or negative attitudes. The student teachers' mean scores on attitudes towards using computers in general and in language learning, Items 1 and 3, show small positive change from pre- to post-course. Student teachers entered the course with positive attitudes (scores of 1 or 2) and finished the course with even more positive attitudes (percentage change Item 1: 21%, percentage change Item 3: 23%). The mean and median scores measuring computer skills in general and as practical to language learning (Items 2 and 4) also show change from pre to post in the hypothesized direction. The greatest improvement was noted in computer skills as applied to language learning (Item 4). This last result is the strongest indicator of the potential for the needs-based training methodology to contribute to positive change in student teachers' skills and knowledge.

Table 4: Mean Pre- and Post-Course NA Scores and Percentage Change on Items Measuring Computer Attitude and Skills in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Item 1 - Attitude toward the use of computers in general			
Pre-course	1.95	0.9	2
Post-course	1.55	0.6	1.5
Difference	0.41	0.80	0
Percentage Change	21%	--	--
Item 2 - Computer skill & knowledge in general			
Pre-course	2.91	0.68	3
Post-course	2.32	0.57	2
Difference	0.59	0.59	1
Percentage Change	20%	--	--
Item 3 - Attitude toward the use of computers in LL situations			
Pre-course	2.14	0.89	2
Post-course	1.64	0.66	2
Difference	0.50	0.74	0
Percentage Change	23%	--	--
Item 4 - Computer skill & knowledge in LL situations			
Pre-course	3.45	0.67	4
Post-course	2.45	0.67	2
Difference	1.00	0.82	1
Percentage Change	29%	--	--

Note: The four items have a possible range from one to four, where one is *excellent* or *very positive*, and four is *negative* or *below average* (Section One on the pre- and post-NAs, Appendices C and D).

Tables 5 through 7 illustrate the student teachers' assessment of their general computer skills and knowledge as measured by the 19 items in Section Two on the pre- and post-NAs. For each question, the student teachers were asked to rate their skill or knowledge based on a five-point scale, where lower scores represented higher skills or knowledge, and higher scores indicated low skills or knowledge. Table 5 presents results for the first seven items (5, 7, 9, 11, 13,15 and 17) which target the two knowledge items and five skills. Positive changes in both the mean and median scores were noted for each of these items. The median scores improved by at least one scale point for each item from pre to post-course. The greatest improvement, as

measured by the percentage change, was seen for Item 5 (understanding the university's technology). This last result may be explained by the needs-based training which emphasized exposure to on-campus technology (touring and working in computer labs, using the university's communication platform and accessing the university course web page).

Table 5: Mean Pre- and Post-Course Scores and Percentage Change for Computer Skill and Knowledge Levels (Items 5–17, Section Two of NAs) in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Item 5 - Understanding C's computer technology			
Pre-course	3.55	1.06	4
Post-course	2.41	0.80	2
Difference	1.14	1.28	1
Percentage Change	32%		
Item 7 - Understanding how computers work in general			
Pre-course	2.73	0.98	3
Post-course	2.27	0.88	2
Difference	0.45	0.86	0
Percentage Change	17%		
Item 9 - Using a PC			
Pre-course	2.64	0.95	3
Post-course	1.95	0.58	2
Difference	0.68	0.84	1
Percentage Change	26%		
Item 11 - Using a Mac			
Pre-course	3.64	1.14	4
Post-course	2.77	0.92	3
Difference	0.86	1.17	1
Percentage Change	24%		
Item 13 -Using a scanner			
Pre-course	4.05	1.40	5
Post-course	3.41	1.44	3.5
Difference	0.64	1.40	0
Percentage Change	16%		
Item 15 - Using CD-ROMs			
Pre-course	3.23	1.34	4
Post-course	2.59	1.30	2.5
Difference	0.64	1.26	0.5
Percentage Change	20%		
Item 17 - Using LL software			
Pre-course	4.27	0.77	4
Post-course	3.14	1.21	3
Difference	1.14	1.21	1
Percentage Change	26%		

Note: The 19 items have a possible range from one to five, where one is *excellent* and five is *non-existent* (Section Two on the pre- and post-NAs, Appendices C and D).

Table 6 presents results for the next six skills items included in Section Two on the pre- and post-NAs. Each of these items (19, 21, 23, 25, 27 and 29) illustrated change in pre- to post-course skill level in the hypothesized (positive) direction. The student teachers showed greatest improvement in the use of presentation (Item 23) and publishing (Item 25) software as well as in their ability to find TESL resources on the Internet (Item 29). Items 23 and 25 are of particular interest as the mean and median pre-course skill levels were *below average* to *non-existent* (*below average* = 4, *non-existent* = 5). Upon completion of the course, mean scores had improved by a minimum of one entire scale point, while the median scores changed by three points in the positive direction.

Table 6: Mean Pre- and Post-Course Scores and Percentage Change for Computer Skill and Knowledge Levels (Items 19-29, Section Two of NAs) in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Item 19 - Using word-processing software			
Pre-course	2.41	1.05	2
Post-course	2.05	1.05	2
Difference	0.36	1.05	0
Percentage Change	15%		
Item 21 - Using spreadsheets			
Pre-course	3.50	1.06	3
Post-course	2.91	0.92	3
Difference	0.59	1.33	0
Percentage Change	17%		
Item 23 - Using presentation software			
Pre-course	4.23	1.15	5
Post-course	1.91	0.75	2
Difference	2.32	1.17	2
Percentage Change	55%		
Item 25 - Using publishing software			
Pre-course	4.36	1.00	5
Post-course	2.55	1.30	2
Difference	1.82	1.44	2
Percentage Change	42%		
Item 27 - Using the Internet for research			
Pre-course	2.45	0.91	2
Post-course	1.59	0.67	1.5
Difference	0.86	1.04	1
Percentage Change	35%		
Item 29 - Finding TESL resources on the Internet			
Pre-course	3.09	1.31	3
Post-course	1.59	0.80	1
Difference	1.50	1.37	1.5
Percentage Change	49%		

Note: The 19 items have a possible range from one to five, where one is *excellent* and five is *non-existent* (Section Two on the pre- and post-NAs, Appendices C and D).

The final six Section Two items (31, 33, 35, 37, 39 and 41) measuring the student teachers' self-assessment of computer skills and knowledge, are presented in Table 7. In this case, the skills are all related to the Internet. Post-course improvement was noted for each of these items. With the exception of the use of email (Item 33), the differences in the mean scores from pre to post-course were at least one scale point in the positive direction. Median scores improved by one to three points for these items.

Table 7: Mean Pre- and Post-Course Scores and Percentage Change for Skill and Knowledge Level (Items 31- 41, Section Two of NAs) in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Item 31 - Assessing TESL resources on the Internet			
Pre-course	3.41	1.26	3.5
Post-course	1.73	0.83	1.5
Difference	1.68	1.64	1.5
Percentage Change	49%		
Item 33 - Using email			
Pre-course	1.86	1.08	2
Post-course	1.36	0.66	1
Difference	0.50	1.10	0
Percentage Change	27%		
Item 35 - Using news groups			
Pre-course	4.00	0.93	4
Post-course	2.68	1.33	3
Difference	1.32	1.32	1
Percentage Change	33%		
Item 37 - Chatting on-line			
Pre-course	3.55	1.34	4
Post-course	2.09	1.06	2
Difference	1.45	1.60	1
Percentage Change	41%		
Item 39 - Setting up a news group			
Pre-course	4.36	1.09	5
Post-course	3.27	1.32	3
Difference	1.09	1.51	1
Percentage Change	25%		
Item 41 - Building a web page			
Pre-course	4.36	1.14	5
Post-course	2.50	1.22	2
Difference	1.86	1.61	2
Percentage Change	43%		

Note: The 19 items have a possible range from one to five, where one is *excellent* and five is *non-existent* (Section Two on the pre- and post-NAs, Appendices C and D).

Overall change in the student teachers' level of general computer skills and knowledge is presented in Table 8. The summary measures of the pre- and post-course scores were calculated as the mean of the scores obtained by all student teachers on all items included in

Section Two of the NAs. The overall mean and median pre-scores indicate that the student teachers began the course with *below average* (*average* = 3, below *average* = 4, *non-existent* = 5) skills and knowledge. These scores improved to above *average* (*good* = 2, *excellent* = 1) by completion of the needs-based training methodology.

Table 8: Mean Pre- and Post-Course Scores and Percentage Change for the 19 Skills and Knowledge Items (Section Two of NAs) in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Overall Skills & Knowledge			
Pre-course	3.46	1.32	4
Post-course	2.36	1.17	2
Difference	1.10	1.38	1
Percentage Change	32%		

Note: The 19 items have a possible range from one to five, where one is *excellent* and five is *non-existent* (Section Two on the pre- and post-NAs, Appendices C and D).

The student teachers' assessments of the importance of including the 19 skills and knowledge items in the course content are presented in Table 9. As indicated by the mean and median pre-scores, the student teachers began the course rating these items as more than *important* (important = 3, very important = 2, extremely important = 1) in terms of their value as course content. While the post-course scores show only small numeric change, this change is in the hypothesized direction. This result demonstrates that the inclusion of these skills and knowledge items in the course content meets the student teachers' self-reported training needs.

Table 9: Mean Pre- and Post-Course Scores and Percentage Change Measuring Student Teachers' Assessments of the Importance of Inclusion of the 19 Skills and Knowledge Items in Course Content in Study 2 (N = 22)

NA Item and Measurement	Mean	SD	Median
Overall Skills & Knowledge			
Pre-course	2.36	1.13	2
Post-course	2.26	1.11	2
Difference	0.11	1.38	0
Percentage Change	4.70%		

Note: The 19 items have a possible range from one to five, where one is *extremely important* and five is *not important at all* (Section Two on the pre- and post-NAs, Appendices C and D).

Table 10 presents results for Section LL of the post-NA. In this section, the student teachers assessed their abilities on 13 general and language-learning pedagogy items as applied to the use of computers in language-learning situations. The mean scores for all items were better than *average* (average = 3, good = 2, excellent = 1). After completion of the needs-based methodology training, the student teachers' self-assessed abilities for pedagogical skills and knowledge as applied to computers in language-learning situations improved to above *average*.

Table 10: Mean Post-Course Scores for Pedagogical Skills and Knowledge as Applied to Computers in Language-Learning Situations in Study 2 (N = 22)

Pedagogical Skills and Knowledge as Applied to Computers in LL Situations	Mean	SD	Median
Item A – understanding technological requirements	2.39	0.84	2
Item B – understanding management concerns	2.36	0.73	2.5
Item C – understanding special populations	2.91	1.11	3
Item D – using whole-class activities	2.45	0.8	2
Item E – using small-group activities	2.18	0.85	2
Item F - using individual activities	2.09	0.87	2
Item G - using collaborative learning	2.18	0.85	2
Item H - using the communicative approach	2.14	0.83	2
Item I. - using form-focused input	2.41	0.91	2.5
Item J - choosing effective LL activities	2.09	0.68	2
Item K - creating effective LL activities	2.18	0.66	2
Item L - using effective LL activities	2.27	0.83	2
Item M - determining learning objectives	2.36	0.9	2
Overall Rating	2.30	0.64	2.27

Note: A low number indicates good skills, while a high number indicates poor skills and knowledge.
Note: The 13 items have a possible range from one to five, where one is *excellent* and five is *non-existent* (Section LL of the post-NAs, Appendix D).

In Section LL of the post-NA, the student teachers were also asked to rate the 13 general and language-learning pedagogy items as applied to the use of computers in language-learning situations in terms of their value as course-content. As shown by the mean and median values presented in Table 11, all items were judged to be *very* to *extremely important* (important = 3, very important = 2, extremely important = 1). These results suggest that student teachers place great value on the integration of general and language-learning pedagogy for computers in their course-content.

Table 11: Mean Post-Course Scores Measuring Student Teachers' Assessments of the Importance of Course Content Inclusion for Pedagogy as Applied to Computers in Language-Learning Situations in Study 2 (N = 22)

Pedagogical Skills and Knowledge as Applied to Computers in LL Situations	Mean	SD	Median
Item A – understanding technological requirements	1.45	0.67	1
Item B – understanding management concerns	1.64	0.66	2
Item C – understanding special populations	2.27	0.88	2
Item D – using whole-class activities	1.91	0.61	2
Item E – using small-group activities	1.91	0.87	2
Item F - using individual activities	1.82	0.85	2
Item G - using collaborative learning	1.68	0.78	2
Item H - using the communicative approach	1.77	0.81	2
Item I. - using form-focused input	2.14	0.77	2
Item J - choosing effective LL activities	1.82	0.96	2
Item K - creating effective LL activities	1.73	0.98	1.5
Item L - using effective LL activities	1.64	0.90	1.5
Item M - determining learning objectives	1.50	0.60	1
Overall Rating	1.79	0.57	1.88

Note: A low number indicates that it is important to include an item in the course content, while a high number indicates that it is not important to include the course-content .
Note: The 13 items have a possible range from one to five, where one is *extremely important* and five is *not important at all* (see Section LL on the post-NAs in Appendices D).

In conclusion, the results of Study 2 demonstrated that student teachers' pre-course attitude scores were above *neutral* and changed little upon completion of the course. Student teachers' general level of computer skills and knowledge improved somewhat from pre- to post-course. Pedagogical skills and knowledge, applied to using computers in language learning, showed the greatest improvement. Each of the 19 individual skills and knowledge items, pre- to post-scores changed in the favourable (positive) direction from pre- to post-course, even for those items where the pre-scores were *below average.* This result was reflected in the summary measure of the 19 skills and knowledge items, where the overall mean pre-score was *below average* and the overall mean post-score was above *average.* In terms of course content, the student

teachers rated the 19 individual skill and knowledge items as being *very important*. Positive results were also noted for student teachers' pedagogical skills and knowledge, as specific to use in computers in language-learning situations. These same items were even more favourably ranked for the student teachers' opinion on including them in the course content.

4.4.3 Statistical Analysis Results for Study 2.

To test association of a needs-based methodology implemented in a computers-in-language-learning course and student teachers' computer skills and knowledge, the student teachers' scores on the NA measurement tool were compared over time[4] (pre versus post-course). Summary scores for the 19 skills and knowledge items of Section Two on both the pre- and post-NAs were calculated per participant. Lower overall scores (NA Section Two: minimum = 19) indicated greater self-rated skills and knowledge, while higher scores (NA Section Two: maximum = 95) showed a lower level of skills and less knowledge. The pre- and post-NA scores obtained by the 22 student teachers were compared using a Paired-Samples T-Test. As shown in Table 12, the mean score obtained on the post-NA (mean = 44.8, S.D = 10.5) was significantly lower than that of the pre-NA (mean = 65.7, S.D = 13.5, $p<0.01$, 95% C.I.[5] for the mean difference: 14.8, 27.0). This indicates significant improvement in self-rated assessment of skills and

[4] Note that this research questions was not tested in Study 1 as the participants were not individually matched from pre to post.

[5] The confidence interval is "a range of values for a variable of interest, e.g., a mean, constructed so that this range has a specified probability of including the true value of the variable" (Last, 1988, p. 28). This means that there is a 95% probability of the value of the true population mean falling within the range of the lower and upper limits of the C.I., if the true population mean could be measured. A smaller C.I., e.g. the range between the lower and upper limits, indicates a more reliable estimate of the sample mean.

knowledge after participation in the needs-based course when compared to the pre-course assessment.

Prior to taking the Computers in Language-Learning course, the student teachers' self-rated level of computer competency and attitude towards computer use in general and in language learning situations varied. To assess for potential differences in the impact of the course on the acquisition of computer skills and knowledge, by student-teachers entry (pre-course skills and knowledge level) level, post-course achievement was compared between two groups of student teachers: 1) those with above average pre-course attitudes and skills and 2) those with below average pre-course attitudes and skills. Items 1 and 3 rated attitudes toward computer use, both in general and in a language learning context, using a four-point scale where one represented 'very positive' and four represented 'negative' attitudes. Items 2 and 4 measured computer skills in general and as applied to language learning activities, where a score of one indicated 'excellent' skills and four 'below average' skills.

Mean scores for Items 1 to 4 were calculated for each participant. Based on the mean scores, the student teachers were divided into two groups. Group One included 14 student teachers whose mean scores for the first four items of the pre-NA were one or two. This group consisted of learners who had *positive* to *very positive* attitudes toward computer use, and *good* to *excellent* computer skills in both the general and the applied (language-learning) area. Group Two included eight student teachers whose mean scores ranged from three to four, indicating a pre-course level of *neutral* to *negative* attitudes toward computers (both in general and in language learning), and *average* to *below average* general and applied computer skills.

A repeated measures multivariate analysis was conducted to test for both a group effect and a group/time effect. As shown in Table 12, while the student teachers in Group Two showed a greater difference in their pre- and post-NA scores (pre mean = 73.2, post mean = 47.3, mean difference = 25.8 points) when compared to the scores of Group One (pre mean 61.4, post mean = 43.4, mean difference = 18.0), there was no statistically significant association between pre-course computer attitude and skill level, and the acquisition of computer skills and knowledge during the course. Thus, no significant interactive effect was noted between group (pre-course level) and time (pre-course, post-course). Whether the student-teachers' self-reported skills and attitudes were above or below average at the beginning, the needs-based methodology of the course contributed to significant improvement among all student teachers in computer skills and knowledge.

This result is noteworthy given that student teachers required to take this course are not a homogeneous group in terms of their pre-course computer skills, and thus the course cannot be tailored to a specific level of learner. Nevertheless, the needs-based approach allowed for the targeting of different individual learner needs and resulted in student-teacher improvement from the beginning to the end of the course.

Table 12: Bivariate and Multivariate Analysis of Pre- and Post-Course Scores on 19 Skill and Knowledge Items and 4 Computer Attitude and Skill Items in Study 2 (N = 22)

NA Item and Measurement	N	Mean	S.D	P-Value
Total Overall Score of 19 Skills and Knowledge Items (Paired T-Test)				
Pre-Course	22	65.7	13.5	
Post-Course	22	44.8	10.5	0.000
Total Overall Score of 4 Attitude and Skill Items (GLM)				
Time				
Pre-Course	22	65.7	13.5	
Post-Course	22	44.8	10.5	0.000
Group				
Pre-Course Level of 1 or 2	14	61.4	14.4	
Pre-Course Level of 3 or 4	8	73.1	7.8	0.076
Time*Group				
Pre-Course				
Level of 1 or 2	14	61.4	14.4	
Level of 3 or 4	8	73.1	7.8	
Post-Course				
Level of 1 or 2	14	43.4	10.3	
Level of 3 or 4	8	47.3	11.1	0.208

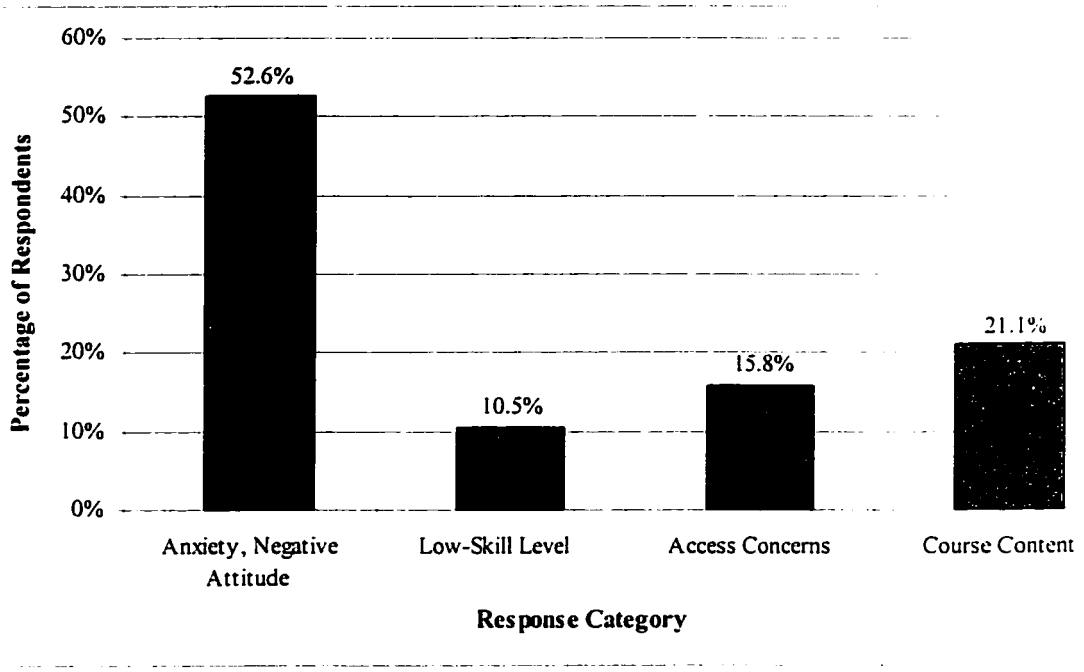
4.4.4 Descriptive Qualitative Data for Study 1.

The key qualitative data obtained from Study 1, illustrating student teachers' general attitudes towards the use of computers in language learning and specific attitudes towards the Computers in Language-Learning course, are presented in Figures 1 through 4. As noted in sections 4.3.3 to 4.3.5, the student teachers' responses to the open-ended questions in Section Three of the pre- and post-NAs were grouped into like themes. These responses were also quantified as percentages to demonstrate the distribution of the responses and as a result, gain a sense of the relationship among the themes and the importance of each individual theme. In this pilot study, 45 and 31 student teachers completed the pre- and post-course NAs respectively.

The data illustrated in Figure 1 provide an indication of the student teachers' attitudes about the Computers in Language-Learning course as measured at the beginning of the course. Among the 45 student teachers who completed the pre-course NA, 19 (42.2%) answered the following question: *Do you have any concerns about this course?* (Section Three, Appendix A, p. 126). The responses were categorized according to like themes[6]. The majority of the student teachers (52.6%, 10/19) reported concerns related to anxiety and negative feelings toward computers while 21% (4/19) were worried about the course content, 15.8% (3/19) had computer-access concerns and 10.5% (2/19) were worried about their low computer-skill levels. The results indicate that these student teachers had attitude-training needs, particularly in the areas of anxiety and negativity. However, the responses reflect the opinions of less than half (42%) of the student teachers. It is not possible to determine whether the other 48%, the non-responders, did not answer this question due to positive attitudes, a lack of concern or whether they merely chose not to answer the question.

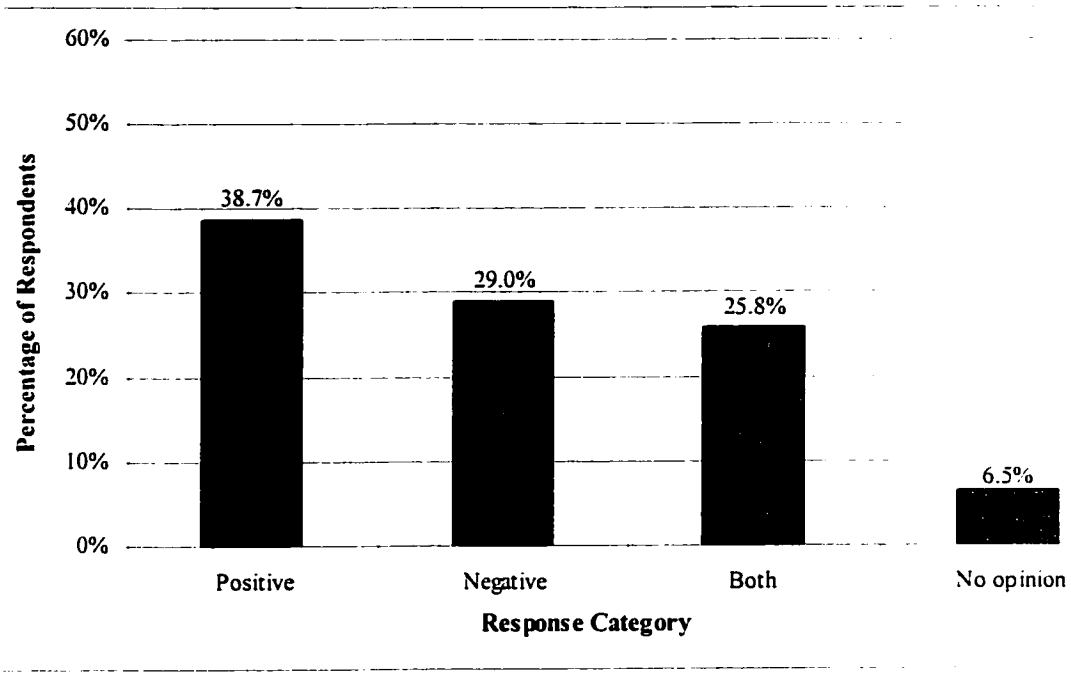
[6] Note that none of the student teachers reported more than one concern.

Figure 1: Student Teachers' Pre-Course Concerns Regarding the Computers in Language-Learning Course as Measured by the Pre-Course NA in Study 1 (N = 19)



Pre-course attitudes towards the use of computers in language learning were measured on the post-NA with the following question: *Before this course, what was your opinion (educational philosophy) on using computers in language learning?* (Section Three, Appendix B, p. 128). All participating student teachers (N = 31) responded to this question. As shown in Figure 2, 38.7% (12/31) recalled that they had a positive opinion, 29% (9/31) a negative opinion, 25.8% (8/31) mixed feelings and 6.5% (2/31) no opinion. If one assumes that teachers need to be positive about the pedagogical tools they use, then these results indicate that the majority (61.3%, 19/31) of the participating student teachers came to the course with important attitude training needs.

Figure 2 : Student Teachers' Pre-Course Attitudes Towards the Use of Computers in Language-Learning as Measured by the Post-Course NA in Study 1 (N = 31)

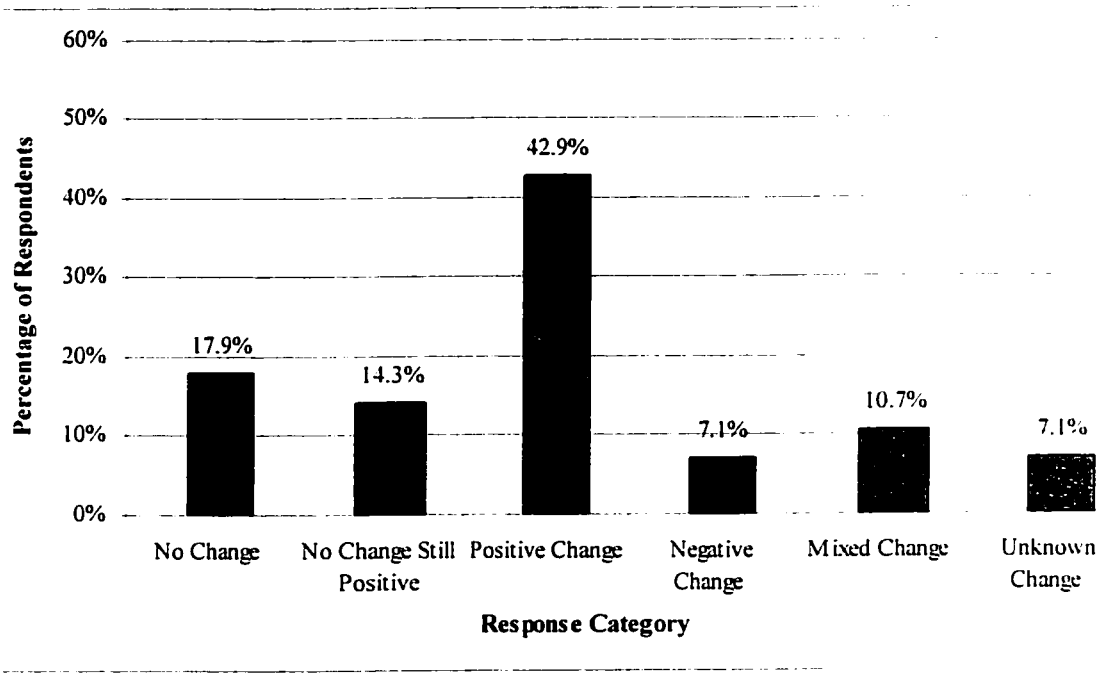


The majority of participating student teachers (90.3%, 28/31) responded to the post-NA question: *Now that the course is almost over, has your opinion on using computers in LL changed?* (Section Three, Appendix B, p. 128). As shown in Figure 3, 42.9% (12/28) of student teachers reported a positive opinion change, 14.3% (4/28) remained positive, and 10.7% (3/28) expressed a mixture of positive and negative opinions. No change in opinion was reported by 17.9% (5/28) of the student teachers, 7.1% (2/28) had an opinion change in the negative direction and for 7.1% (2/28) there was an unidentifiable change.

Due to the fact that student teachers were not matched from pre to post in Study 1, direct linkage of within-student pre- and post-course NA results could not be made. Thus, direct comparisons and measures of change from pre- to post-course must be interpreted with caution. Despite this methodological limitation, this course, using a

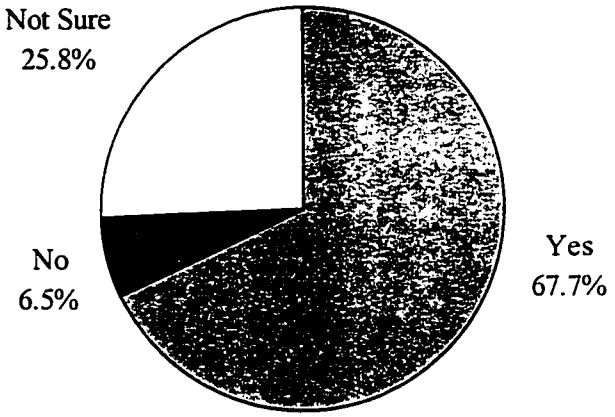
needs-based methodology, contributed to positive self-reported changes in attitudes towards the use of computers in language-learning among the post-NA student teachers.

Figure 3: Student Teachers' Post-Course Attitudes Towards the Use of Computers in Language-Learning as Measured by the Post-Course NA in Study 1 (N = 28)



All student teachers (N = 31) responded to the following post-NA question regarding their future teaching: *Will you use computers in language-learning?* (see Section Three in Appendix B, p. 128). Figure 4 shows that the majority, 67.7% (21/31), intend to use computers in language-learning, 25.8% (8/31) are not sure while 6.5% (2/31) will not. This finding indicates that the needs-based methodology helped the majority of student teachers to acquire the necessary attitudes, skills and knowledge in order to incorporate computers in their future teaching.

Figure 4: Student Teachers' Post-Course Attitudes Towards the Use of Computers in Language-Learning in Their Own Future Teaching as Measured by the Post-Course NA in Study 1 (N = 31)



In conclusion, the qualitative data show that some of the student teachers began the course with anxiety-related concerns and had negative attitudes toward using computers in language-learning. Post-course responses indicate that there was positive change in opinion on using computers in language-learning. Most importantly, the majority of student teachers expressed an intention to make use of computers in their future teaching.

4.4.5 Descriptive Qualitative Data for Study 2.

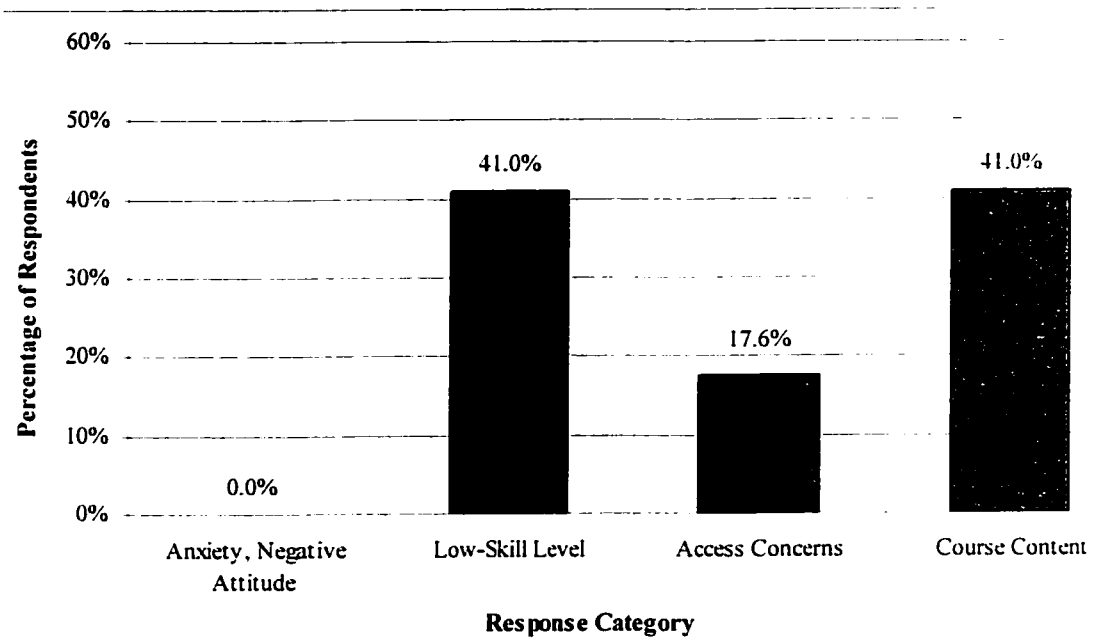
The key qualitative data from Study 2, illustrating student teachers' general attitudes towards the use of computers in language learning and specific attitudes towards the Computers in Language-Learning course are presented in Figures 5 through 8. As

noted in section 4.4.4, the student teachers' responses to the open-ended questions on the pre- and post-NAs were grouped into like themes and quantified as percentages to gain a sense of the relationship among the themes and the importance of each individual theme. The student teachers' descriptions of the types of computer activities they intend to use in their future teaching are presented in Figure 9. In this study, 22 student teachers completed the pre- and post-course NAs respectively.

The data illustrated in Figure 5 provide an indication of the student teachers' attitudes about the Computers in Language Learning course as measured at the beginning of the course. Among the 22 student teachers in the pre-course NA, 17 (77.3%) answered the following question: *Do you have any concerns about this course?* (Section Three, Appendix C, p. 130). The responses were categorized according to like themes[7]. An equal number of the student teachers (41.2%, 7/17) were worried about either low computer skill level or course content while the remaining 17.6% (3/17) expressed computer-access concerns. The 77% response-rate indicates that a large majority of student teachers had concerns, particularly in the areas of their computer skills and the course content. However, this response-rate does not reflect the opinions of the remaining 23 %, the non-responders, who may not have answered because they had a positive attitude, did not have any concerns or merely chose not to answer the question.

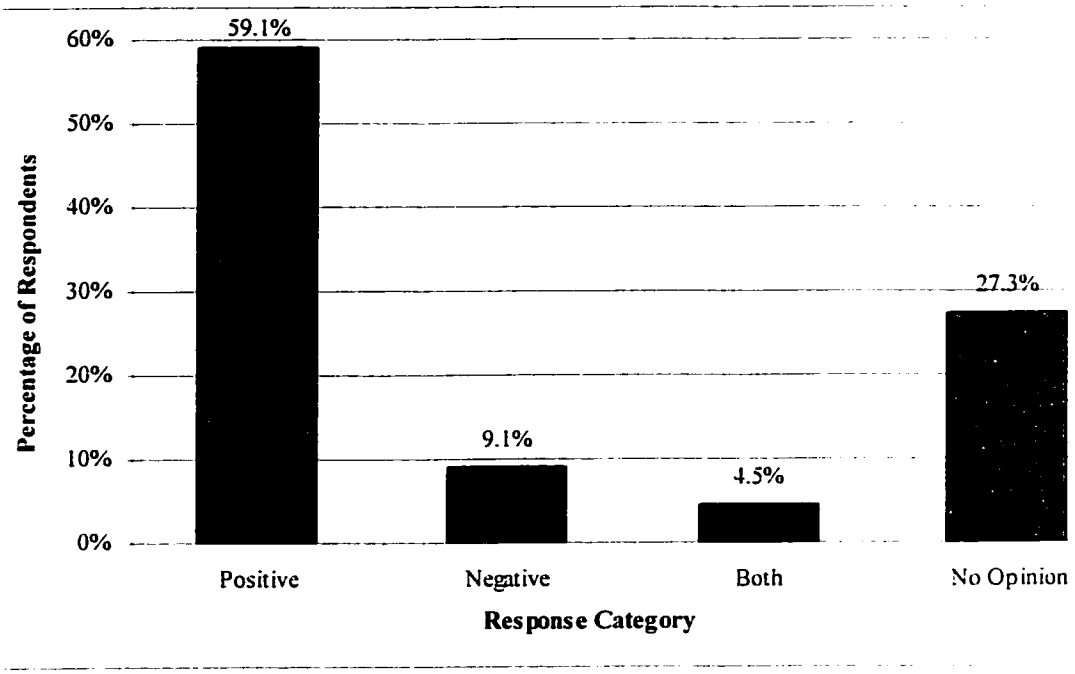
[7] Note that none of the student teachers reported more than one concern.

Figure 5: Student Teachers' Pre-Course Concerns Regarding the Computers in Language-Learning Course as Measured by the Pre-Course NA in Study 2 (N = 17)



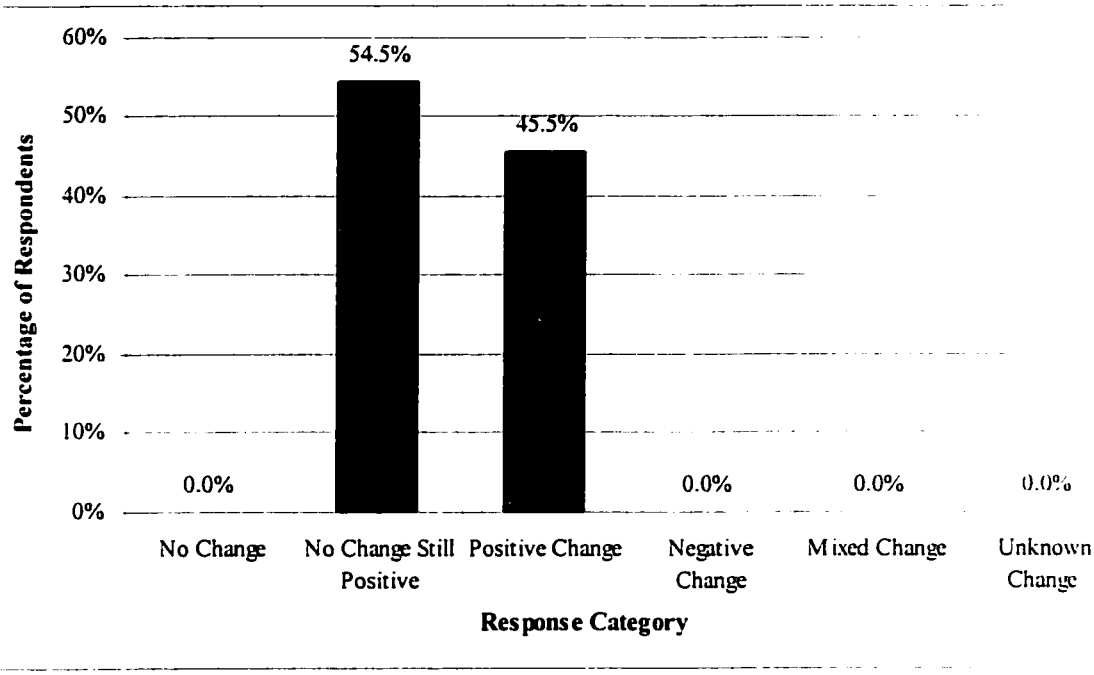
Pre-course attitudes towards the use of computers in language learning were also measured on the post-NA with the following question: *Before this course, what was your opinion (educational philosophy) on using computers in language learning?* (Section Three, Appendix D, p. 133). All the student teachers (N = 22) responded to this question. As shown in Figure 6, 59.1% (13/22) reported that they had a positive opinion. 27.3% (6/22) had no opinion, 9.1% (2/22) expressed a negative opinion and 4.5% (1/22) had mixed feelings. If one assumes that teachers need to be positive about the pedagogical tools they use, then these results indicate that the majority (59.1%, 13/22) of the student teachers came to the course with a positive attitude. However, at least some of the remaining 40.9% (9/22) had important attitude-training needs.

Figure 6: Student Teachers' Pre-Course Attitudes Towards the Use of Computers in Language-Learning as Measured by the Post-Course NA in Study 2 (N = 22)



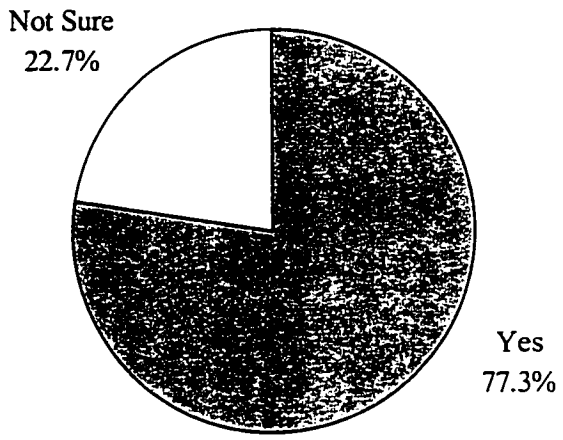
All student teachers (N = 22), responded to the question: *Now that the course is almost over, has your opinion on using computers in LL changed?* on the post-NA (see Section Three, Appendix D, p. 133). As shown in Figure 7, 45.5% (10/22) had a positive opinion change while 54.5% (12/22) remained positive; the remaining categories had no responses. The Computers in Language-Learning course contributed to positive self-reported changes in attitudes towards the use of computers in language learning among 45% of the student teachers. Furthermore, among the 54.5% (12/22) student teachers whose opinion remained positive, there were a number of comments to suggest that their opinion had become even more positive. The following comments are representative: "My reasons have expanded and are more grounded in pedagogical terms and clearer in purpose." ; "Now I know how to use computers to teach." , "I am more motivated to use computers." and "I feel more confident about using computers in language learning ".

Figure 7: Student Teachers' Post-Course Attitudes Towards the Use of Computers in Language-Learning as Measured by the Post-Course NA in Study 2 (N = 22)



On the post-NA, all of the student teachers (N = 22) responded to the following question: *Will you use computers in language-learning?* (Section Three, Appendix D. p. 133). Figure 8 shows that the majority, 77.3% (17), intended to use computers in language-learning while 22.7% (5) were not certain. This result indicates that the needs-based methodology has helped the majority of student teachers acquire the necessary attitudes, skills and knowledge to use computers in their future teaching. Among the five student teachers who were uncertain, their stated reasons were not related to the course methodology: *It depends on the technology available in the school* (4) and *Will use it if I have the time and opportunity* (1).

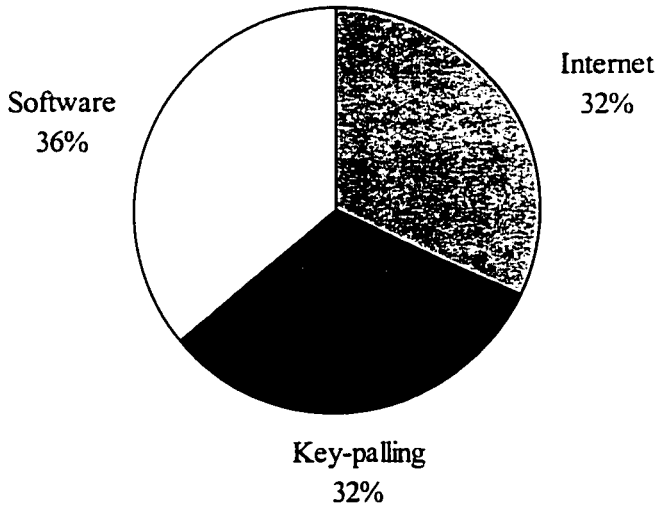
Figure 8: Student Teachers' Post-Course Attitudes Towards the Use of Computers in Language-Learning in Their Own Future Teaching as Measured by the Post-Course NA in Study 2 (N = 22)



The majority of student teachers (N = 17) responded to the following post-NA question: *Will you use computers in language-learning? If yes, what types of activities...?* (Section Three, Appendix D, p. 133). The 77.3% (17/22) of student teachers who responded positively provided a total of 25 comments. Thirty-six percent (9/25) of the comments referred to software activities such as using PowerPoint, 32% (8/25) of the remarks were related to Internet activities such as research, and the remaining 32% (8/25) of the comments mentioned email such as key palling. This result sheds light on how the student teachers intend to use computers in language-learning. Perhaps the listed activities are those where the student teachers feel the most competent; they may also be the skills which the student teachers perceive to be the most pedagogically valid; or these activities may directly reflect the Computers in Language-Learning course content. For

many student teachers, their choice of activities is likely to be related to a combination of the above-listed reasons.

Figure 9: Student Teachers' Post-Course Activity Choices for Their Own Future Teaching as Measured by the Post-Course NA (N = 25 comments)



In conclusion, the qualitative data show that some of the student teachers began the course with concerns related to low skill levels and the Computers in Language-Learning course content. Responses after the course indicate that there was positive change in opinion on using computers in language-learning. Most importantly, the majority of student teachers expressed their intention to make use of computers in their future teaching and many have concrete ideas about which activities they intend to use.

4.4.6 Qualitative Analysis of the Self-Assessments in Study 2.

The 11 Self-Assessments provided anecdotal evidence to support the finding that the needs-based training methodology led to changes in student teachers' attitudes, skills and knowledge. In each of the Self-Assessments, the student teachers in Study 2

narrated their 'evolutions' in terms of their feelings and/or competencies. Note that the names used below are not the student teachers' real names.

Although the Self-Assessment guidelines did not require the student teachers to comment on their feelings, many of them did. Caitlin wrote "when I first started this course I had a lot of anxiety about using computers. This course has given me the chance to learn at my own pace and quell the panic of using computers." Celine shared her fears: "At the beginning of the course, I did not know very much about computers and was quite fearful about learning to use them because I felt I couldn't learn how to. ... I can say that I am not fearful of computers any longer!" Anne's excerpt attributed her attitude change to modeling opportunities: "After seeing some of the possibilities, especially after the presentations of the final projects, I would be a fool not to embrace computers in language learning."

While the above student teachers' excerpts focused on their overall attitude change, others commented more on their newly acquired skills. Tobia detailed her new skill set in the following comments: "I learned more about how to do Power Point presentations, how to create spreadsheets and how to design a web page. ... I am now familiar with Mac computers, CD-ROMs, finding TESL resources on the Internet and chatting on line." Danielle also provided comments on her skill acquisition but was more critical of herself and the time constraints of the eight-week course: " One challenge was working with PowerPoint... I was worried that I would fall behind but I actually fell in love with it as it is extremely user-friendly... The only regret I have is ... I really wanted to build a web page but due to lack of time and difficulty I had, I decided to build one once the course is over."

Many of the Self-Assessments were a combination of changes in attitude, knowledge and skill. These comments help to show the relationship among them; for example, attitude can affect competency and vice versa. Kia connected her change in attitude and skills to her future goals: "To tell you the truth, at first I was not ready to embrace the idea of using computers in language-learning teaching. However, with your help, I have totally changed my mind. Now that I am able to use computers without going crazy, I love the idea of using them in a language-learning setting." Maya's writing narrative also linked the two factors: "Over the course of these eight weeks my attitude towards the use of computers in a language-learning context has evolved from ambivalence to enthusiasm. ... As the eight weeks progressed, my computer skills sharpened and the idea of integrating computers into my classroom became more than a definite possibility." Sonia offered a powerful message of how far she had come: "In the beginning of the class my opinion of computers in a LL situation was that they did not have a place. PERIOD. Now I realize that with careful planning not only can computers be used, but they have many advantages..." Macey described her learning process in terms of abilities and feelings: "In terms of my personal learning, it was amazing to see that I am actually able to create a web site. I used to be terrified of Macs... I have learned to appreciate them... I learned so much about what we can do with computers in language learning." Finally, Alia's writing connected attitude and skill: "When I registered for this course, my computer knowledge was very basic. I was not sure how you could associate computers and language learning. I always thought the chalkboard was the only medium to teach a language. I considered the computer as a complicated

method of teaching. Apparently, I was wrong. I have learned a lot in this course. I learned to view computers as a teacher's friend."

These quotations enrich our understanding of the roles that attitude, knowledge and skill level play on their own or as a group. The expressed initial reservations, fears, lack of knowledge and skills indicate that these student teachers entered the course with challenging computer-training needs. The fact that their comments reported progress supports the idea that the needs-based training methodology can lead to self-reported changes in some student teachers' computer-training needs .

4.4.7 Modeling Opportunities for Studies1 and 2.

Three pieces of data offer insight into the student teachers' modeling opportunities, or lack thereof. An interview, the pre-NA and the Post-Internship Survey serve to shed some light on two of the research questions: 1c) to identify student teachers' modeling training needs, and 2c) to determine if the use of a needs-based training methodology leads to change in student teachers' modeling opportunities.

The data suggest that the teacher-training institution in which these studies were conducted needs to offer more faculty modeling opportunities. According to the undergraduate program director, with the exception of word-processing and two key pal projects, the professors within the department did not model technology in their teaching (winter 2001, autumn 2001). The student teachers were also not likely to observe their supervising teachers use technology according to the pre-NA and the Post-Internship Survey. In the pre-NA (Appendix A, p. 126), the second open-ended question was *Have you heard about, tried or worked with a teacher who has used computers in language*

learning? If so, please describe the activities. In Study 1, of the 46 student teachers who had completed a placement, only 11 (24%) said they had seen their placement teachers use computers with their students. In Study 2, a question on whether the student-teacher had completed a placement was included. In fact, only half of the 22 student teachers had completed a placement and seven (64%) of these 11 had seen their supervising teachers use computers. Examples of activities they had seen included building a school web page, key palling, doing research, using Power Point and word processing, completing listening and vocabulary activities, doing crossword puzzles, completing marking sheets, and playing games.

According to the Post-Internship Survey, conducted almost one year after the pre-NA of Study 1, the situation was no better. As explained in Section: 3.6.5, at the time of survey administration, the student teachers were in another course in a 'wrap-up' session after having just completed their first or second school placement. The Post-Internship Survey (Appendix E, p. 134) indicated that of the 34 student teachers surveyed in December 2001, six (18%) were in classrooms where teachers modeled the use of computers in language-learning with their students. The conditions varied greatly however. One student teacher was placed in a school where all students had lap-top computers, the teacher had access to a smart board and 75% of the activities involved computers. In contrast, among the other five who did see their supervising teachers model technology, some of the comments regarding computer use included *hardly ever used* and *only used once in a while*, while activities included *just for games*, *as a reward*, *for students to catch up on missed work* and *only to type vocabulary words*. Although very few supervising-teachers modelled computers in their actual teaching, 11 (32%) of

the supervising-teachers used computers for tasks such as grading, emailing, and preparing tests and lesson plans.

4.5 Conclusion

In both Studies 1 and 2, the data demonstrated that many student teachers began the Computers in Language-Learning course with weak skills and knowledge. Meaningful post-course improvements were noted. Statistically significant improvement in the Study 2 student teachers' skills and knowledge was seen from pre- to post-course. No significant interactive effect was noted between group (level of pre-course computer attitude, skill and knowledge) and time (pre-course, post-course). Regardless of the level of the student teachers' computer attitude and competency at the time of course enrollment, significant improvements were noted upon completion of the course. There was a suggestion, based on comments from the Study 2 Self-Assessments, that these changes were attributable to the pedagogical intervention. The pre-qualitative data in both studies indicated that attitude and low-skill level concerns were considerable issues for some student teachers; post comments revealed that the majority had a positive attitude change and intended to use computers in their future teaching. Student teachers from both studies were lacking in faculty and supervising-teacher models.

Chapter 5: Discussion and Conclusion

5.1 Introduction

The objectives of the current research were 1) to identify and describe student teachers' computer training-needs, defined as attitude, skills and modeling opportunities, with a view to incorporate the use of computer technology as an educational tool in their future teaching, and 2) to assess the impact of a "Computers in Language-Learning" course on the computer-training needs of student teachers. This course, which utilized a needs-based training methodology, was the intervention component of the reported research. Participating student teachers' computer-training needs were assessed using three measures: a Needs Assessment (NA) questionnaire, a Post-Internship Survey and Self-Assessments. The goal of this chapter is to compare the results of these measures (Study 1 versus Study 2), and to relate them to the research questions. The findings are then used as a basis for recommendations for training TESL student teachers to use computers in their future classrooms. The limitations of the studies and suggestions for future research are discussed. Finally, the key findings and their implications are summarized in the conclusion.

5.2 Discussion of the Results and their Significance

5.2.1 Attitude.

Qualitative and quantitative data obtained were used to address the first research question (1a) : *In order for student teachers to include computers in their teaching, what are their needs in terms of attitude?* Pre-course attitude-training needs were observed

among participating student teachers in both studies. As shown by the qualitative data, the majority (63.1%) of Study 1 student teachers expressed pre-course concerns in terms of anxiety or negative attitudes (52.6%) or concerns related to a low computer-skill level (10.5%). Of the 22 student teachers included in Study 2, 41% expressed their course concerns in terms of low pre-course computer skills, while there were no anxiety or negative-attitude comments. The different starting points may be explained by the timing of the pre-NA and/or in how the student teachers expressed their concerns. For instance, it can be argued that the expression of course concerns in terms of skill level is a type of anxiety. If this is the case, the total percentage (63.1%) of Study 1 student teachers who expressed pre-course concern is much higher than that observed in Study 2 (41%). These results are reflective of those obtained by McInerney, McInerney and Sinclair (1994), who measured student computer attitudes using the Computer Anxiety Rating Scale. Of the 101 participants, 40% expressed substantial pre-course anxiety. Whether or not a low-skill level is seen as an anxiety-causing factor, both categories point to a need for specialized instruction to address these concerns. The other findings for this research question are discussed in conjunction with the findings of the second research question below.

Does using a needs-based training methodology for a computers-in-language-learning course lead to changes in the student teachers' assessments of attitudes? was the second research question (2a) related to attitude. Only small quantitative improvements were noted in the student teachers' self-reported attitudes in Study 2, while in Study 1 there was change in the negative direction. The fact that there were only slight changes in either direction may be explained by the student teachers' initially positive

scores. Furthermore, it may be argued that improvements in skills and knowledge are associated with more positive attitudes toward computers. In both Study 1 and 2, meaningful improvements were noted in computer skills and knowledge, as seen in the next section. As well, meaningful change in computer attitude, as assessed using qualitative data obtained from the post NAs, was noted in both Study 1 and Study 2. Responses obtained from the student teachers upon completion of the Computers in Language-Learning course indicated that many of the participating student teachers (42.9% in Study 1 and 45.5% in Study 2) experienced positive opinion change with respect to the use of computers in language-learning. Furthermore, the majority of student teachers (67.7% in Study 1 and73.3% in Study 2) responded with certainty that they would use computers in their future teaching. These results suggest that, with completion of the Computers in Language-Learning course, the student teachers included in these studies gained the necessary attitude and skills to do so.

Additional data from Study 2 also clearly show encouraging attitude-change patterns. The positive change in attitude pattern is evident in the Self-Assessments, where some of the comments make a direct connection between attitude change and components within the specialized course.

Tests for significance showed that whether the student teachers' initial attitudes and skills were positive or negative, there was significant improvement in their skill and knowledge from the beginning to the end of the course. Similar to other research in this area, these changes in attitude may be attributed to the specific methodology used in the intervention (Gunter, Gunter & Wiens (1998); Savenye ,1993). On the other hand, the significant result may only point to the idea that increased experience and certain types of

training, but not necessarily the needs-based training, leads to a decrease in computer anxiety (Larose, Lafrance, Grenon, Roy & Lenoir, 1998; McInerney, McInerney & Sinclair, 1994). However, when this significant result is considered in combination with the results from the other data, there is an indication that the needs-based training played a role in positive attitude change.

5.2.2 Skills and Knowledge.

The first research question (1b) related to skills and knowledge was the following: *In order for student teachers to include computers in their teaching, what are their needs in terms of skills and knowledge?* The objective of this question was to identify and describe student teachers' skills and knowledge training-needs in order to include computers in their teaching. The data in Study 1 and Study 2 demonstrate that many of the student teachers began the course with weak skills and knowledge. This finding is further substantiated in Study 2 where 14 of the pre-skills and knowledge items had below-average mean scores, and 41% of the student teachers had initial low-skill level concerns. Russell, Finger and Russell (2000) also noted significant skill-deficit areas among many surveyed teachers.

The second research question (2b) in this area was the following: *Does using a needs-based training methodology for a computers-in-language-learning course lead to changes in the student teachers' assessments of skills and attitudes?* Results from both studies suggest that the special training led to improvement in computer skill and knowledge levels. The student teachers' general computer skills and those applied to language-learning improved with the greatest gains noted among the student teachers included in Study 2. In both studies, even the initial weak skills and knowledge items

showed change in the hypothesized direction. Similar gains were reported in Levin's 1999 work, where mean scores for self-efficacy, attitudes, skills and knowledge improved after technical training; those who received more, had greater increases. Another study noted some encouraging changes in computer literacy after student teachers completed a training course (Larose, Lafrance, Grenon, Roy & Lenpoir, 1998).

The 19 skills and knowledge items in Study 2, initially rated as weak, showed a similar trend: change in the positive direction. Ten of the items showed percentage gains of 30% or higher. These same items were assessed as being important in terms of their value as course content. Note that the above-mentioned data were not part of the Study 1 analysis. There were good (above *average*) results for both Study 1 and Study 2 in terms of the student teachers' self-evaluations of pedagogical topics as they apply to computers and language-learning situations. These results are even more favourable for the Study 2 student teachers' opinion on including these items in the course. Statistical analysis found significant improvement in the student teachers' self-reported evaluations of their skills and knowledge after participating in the needs-based training. These results were also found to be significant regardless of group: student teachers with above-average skills, knowledge and attitudes improved throughout the course, as did those with average to below-average skills, knowledge and attitudes. Some of the Self-Assessments in Study 2 lend support to the idea that the above-noted changes can be specifically attributed to the pedagogical intervention and not only to other factors, such as change over time. Comments related to skills and knowledge all show progress; this progress is often attributed to specific aspects of the course design.

5.2.3 Modeling Opportunities.

In order for student teachers to include computers in their teaching, what are their needs in terms of modeling opportunities? was the first research (1c) question in this area. The data demonstrate that the student teachers lacked modeling opportunities from their faculty and their supervising teachers. The lack of opportunities was found to be two-fold: there were insufficient numbers of role models and much of the actual modeling was limited to basic skills such as word-processing, computer games and grading. For example, on the Post-Internship Survey, only 18% of the student teachers were in placements which included computer modeling. Similarly, Bosh and Cardinale (1993) surveyed 187 student teachers; only 21% of participants saw their supervising teachers use computers for instruction and this was limited to basic computer skills. The lack of advanced skill modeling opportunities was also noted by Carlson and Gooden (1999). In their study, 411 student teachers indicated that word-processing was the only technology consistently modelled among their professors and supervising teachers.

The second research question (2c) in this area was the following: *Does using a needs-based training methodology for a Computers in Language-Learning course lead to changes in the student teachers' assessments of modeling opportunities?*. Although the NAs did not include this specific question and therefore no direct causal relationship can be drawn between the impact of the intervention and modeling opportunities, the course design points to opportunities for positive change to occur in this area. The student teachers were part of a course which included teacher, teaching-assistant, guest-lecturer and final presentation modeling. Models of exemplary coursework and student-teacher work were provided on the course web page as well. Moreover, based on some

comments in the Self-Assessments, there was a suggestion of positive change in student teachers' modeling opportunities. Comments like the following connect positive-attitude change to modeling opportunities: "After seeing some of the possibilities, especially after the presentations of the final projects, I would be a fool not to embrace computers in language learning."

5.2.4 Conclusion

The majority of the data showed that the trends observed in Study 1 were present in Study 2; in many instances, they were more salient in Study 2. The statement above serves to validate the Study 1 results, despite the fact that it was a pilot study. There were, however, some different trends in the two studies. First, student teachers in Study 1 tended to express most of their pre-course concerns in terms of anxiety and negative attitude, while all Study 2 comments were related to low skill level. Second, there was a pre-NA difference in the number of student teachers who completed placements where computer modeling was observed (24% in Study 1 and 64% in Study 2).

5.3 Recommendations for training student teachers in general and specific to the Institution in this Research

5.3.1 Introduction.

Based on the current research and that noted in the literature review, for student teachers to acquire effective computer competencies, training institutions must offer three things: 1) opportunities for modeling, 2) technology infusion within the program and 3)

well-designed courses (Adbal-Haqq, 1995). The teacher-training institution in this research falls neatly into the above statement. The results of this research and the student teachers' educational settings also make it necessary to focus on the student teachers' needs (4) and the requirements of the Ministry of Education (5). These five areas are addressed in the following section. For optimum effectiveness, these recommendations should be implemented together.

5.3.2 Modeling Opportunities: How the Faculty Can Play a Role.

TESL student teachers need to see their professors model the use of computers in their own teaching. This is easiest to accomplish in the actual Computers in Language-Learning course. However, if the modeling is limited to word-processing (see Carlson & Gooden, 1999) and the computer course, then opportunities are lost. Other faculty members should include the use of computers in their TESL courses. One interesting way of achieving this goal is to create collaborative activities between the Computers in Language-Learning course and other courses. For example, at the institution examined in this research, the professor who teaches one of the pedagogy courses collaborated with the Computers in Language-Learning professor (autumn, 2002). In this case, many of the same TESL and ESL Internet sites were incorporated into activities preparation.

Another example of faculty modeling is the use of a common communications platform. In this case, some of the TESL faculty and student teachers use the First Class communication platform for email, chatting and web-page building (autumn, 2002). Other modeling examples would include having a course web page, responding to learners via email, using Presentation Software, using computers for research papers,

recommending TESL and ESL software and Internet sites, integrating a key palling project with non-native speakers into a language-acquisition course, requiring computers to play a role in lesson plans and as suggested by Kamhi-Stein (2000a, 2000b), using electronic bulletin-board for some discussions.

Not only do student teachers need to observe role models in their on-campus courses, they need to see computer modeling in their placements. The faculty can help by placing student teachers with supervising teachers who use computers in their ESL teaching (Dawson & Norris, 2000). Since there may not be many of these types of supervising teachers, the faculty could encourage ESL teachers to improve their skills by taking a Computers in Language-Learning course (Dawson & Norris). For all of these types of modeling opportunities to occur, the teacher-training institution must support the professors and supervising teachers by providing training and technical support.

5.3.3 Technology Infusion and Other Options: How the Faculty Can Play A Role.

To successfully integrate technology into TESL teacher-training, the faculty must first choose a model which suits their needs. Time, money, institutional support, attitudes, skills, knowledge, as well as personnel and equipment resources, are some of the factors to be considered. This is because the planning process and initial steps of the implementation of a model would vary depending on these factors. There are four possible models: 1) the single course option, 2) technology infusion into many courses, 3) individual student-performance tracking and 4) a case-based approach (see Gillingham & Topper, 1999, in Wildner, 1999, pp. 230-233). Some might argue that the elimination

of the single course option in favour of the technology-infusion model is the ideal situation. However, the latter requires team work, faculty expertise, as well as institutional support in terms of time, training, equipment and money. At the time of the writing of this thesis (autumn, 2002), the teacher-institution in question does not seem to have met the necessary criteria to depend solely on this technology-infusion model. It may also be argued that training TESL student teachers to use computers merits its own pedagogical course. This way computers in language learning has the same 'status' as other TESL pedagogy topics such as language acquisition for example. Furthermore, the needs of certain student teachers with negative attitudes and low skill levels are perhaps better addressed in a specific course. The immediate goal for the TESL Centre in this research, and possibly other institutions, is to continue to make the single-course model mandatory while at the same time encouraging technology infusion within other courses, tracking each student teacher's computer competencies across the program, and using case studies in teaching. The long-term objective is to develop a personalized and eclectic model which suits the needs of the institution, faculty, student teachers, the Ministry of Education, and of course, the schools where the student teachers will do their placements and eventually be hired. Since there are advantages to each of the four models, an attractive solution would be to incorporate the beneficial aspects of each into the TESL teacher-training program.

5.3.4 A Well-designed Course: Another key to Success.

Recommendations for course design include offering support for student teachers in the area of skill development; fostering the acquisition of skills within a teaching environment, in this case a language-learning context; modeling first-rate technology

practices; and using instructional strategies to decrease computer anxiety (Fisher, 2000). The results of the NAs from Study 1 and Study 2 support the above and should therefore continue to be the driving forces within the needs-based methodology.

To ensure a well-designed computer-training course for student teachers, the revisions made to the needs-based methodology after the analysis of the Study 1 results should be maintained. These changes included the teacher having a better understanding of how to apply the methodology, a lower student-to-teacher ratio, access to high-quality computer labs, more teaching time within a better classroom, improved presentation tools and web page and a common communications platform. Although the effectiveness of the having a teaching assistant during lab sessions was not directly measured in this research, improvements in skills and knowledge from pre- to post-course in both studies suggest that this factor may have played an important role and should therefore continue to be an essential component of the course design.

Aspects of Gunter, Gunter and Wiens' (1998) useful course design (high-impact and low-threat approach) should also be considered. High-impact refers to covering several different computer and education topics during the course, whereas low-threat includes motivation and empowerment activities, as well as the absence of traditional testing. In this design, the evaluation tools are mandatory class attendance, hands-on exercises, projects, reflections and presentations. Many of the aspects mentioned above are already part of what is known as *Needs-based Methodology*, a methodology that can be improved with more research and revisions. After reviewing results of Study 1 and Study 2, it is clear that qualitative research, related to using this methodology for training student teachers to use computers, should include interviews with student teachers after

completing the course. Questions would focus on the pedagogical approaches used in the methodology. One revision would be to eliminate some of the traditional testing in favour of more individual goal setting and alternative-testing tools, for example, self-assessments . Other forms of alternative evaluation include using more anecdotal feedback, creating on-line computer portfolios for job-hunting purposes and a final competency assessment: satisfactory or unsatisfactory, as opposed to a final grade. These suggestions would help to target the attitude concerns expressed by some of the student teachers in both studies.

5.3.5 The Learners: TESL Student teachers.

It is important to continue to identify the student teachers' needs as they will vary depending on the individual, the cohort and over time. Watson's qualitative research concluded there is a need for skills-based instruction which is tailored to a variety of different learners as the participants' perceptions were often age- and gender-related (Watson, 1997). In Hunt's and Bolin's (1993) sample, 40% of 101 participants had considerable anxiety before the course, while 20% still expressed a substantial level of anxiety after the course. They suggest developing measures to identify student teachers with high anxiety as they will likely require specialized instruction.[8] A few of the pre-NA comments in both studies indicated that there were some student teachers who began the course with considerable anxiety. Consequently, implementation of systematic use of measurement tools such as the Needs Assessment, the Post-Internship Survey and the

[8] This in fact has been my experience as a teacher. Those few students who came to the course with high levels of anxiety did require specialized instruction which included supplementary modeling, explanations, encouragement, active listening, time and general support.

Self-Assessment is advisable as this will permit identification of those with special needs such as high anxiety and low skills.

5.3.6 The Ministry of Education: TESL, ESL and Computer Competencies.

Because recent changes to programs of study at elementary, secondary and university teacher-training include an increased use of technology (Quebec Ministry of Education 2001a, 2001b), the TESL Centre at the university in turn must embrace these changes in their teacher training. A review of the reforms at both the elementary and teacher-training levels indicates a shift toward the following: competency-based evaluation and technology infusion; the inclusion of cross-curricular objectives; the use of computers within a strategy-acquisition and problem-solving framework, as opposed to the use of basic skills for simple tasks; and the integration of computer skills within a variety of ESL and TESL contexts. As time passes and computers assume an even more integral role in our society, future educational reforms are likely to include an even greater emphasis on technology. These reforms this will shape how TESL student teachers acquire computer competency within an ESL context. The key is to stay abreast of these changes so they continue to form the base for decisions regarding student-teacher computer and language-learning training. For, although meeting the student teachers' needs is essential, so too must the needs of the schools and ESL learners be met.

5.4 Limitations of the Research.

Similar to other studies within the area of student teacher and computer training, this research may be found lacking if examined from a traditional standpoint that requires

established theories. The methodological approach employed in this research was primarily exploratory. This thesis invested more time in describing phenomena, as opposed to explaining them. Given the limited amount of theorizing and published research on training TESL student teachers to use computers, this study contributes to the field by identifying and describing TESL student teachers' computer-training needs, and using original measurements to assess the impact of a specific methodology on these needs.

Although there were many similar patterns in the results of Study 1 and Study 2, the results of Study 2 showed an overall tendency for more positive and greater improvements than those of Study 1. However, it is not possible to make direct comparisons from Study 1 to Study 2 due to changes in the research protocol and the needs-based methodology made during the interval between the tow studies. It is not possible to identify the reasons for the observed tendency toward overall better findings in Study 2. The differences may be attributable to changes in the research design, changes to the intervention or both. Research-design factors included the use of a new measurement tool (the Self-Assessment), individual student-teacher matching from pre- to post-course NAs, tests of significance, a greater participation retention rate, revisions to the NAs and the timing of the pre-NA. Changes to the intervention consisted of a better quality needs-based training methodology (e.g. more experienced teacher), a smaller student-teacher ratio, easier access to better quality computer labs, a more suitable classroom, additional teaching time, a different teaching time and format, improved presentation tools and web page, and using similar email and chatting platforms.

The findings of Studies 1 and 2 were limited by small sample sizes. A small sample size reduces the ability to generalize conclusions based on this research to TESL student teachers in other contexts. However, this study limitation did not seem to affect the reliability of the quantitative results and the stability of the estimates, as suggested by the small standard deviations of the mean scores. Furthermore, the small sample size did not affect the power to detect significant change from pre- to post-course skill and knowledge levels among student teachers included in Study 2. The results of Study 1 were further limited given the lack of individual within-student-matching of the pre- and the post-NAs thus limiting data analysis to descriptive measures only with no statistical testing. Thus a direct causal relationship between the intervention and student-teachers' computer-training needs can not be inferred. Since only one cohort of student teachers was available per term, there was no possibility of a control group. Therefore, some of the observed change is likely due to other factors (measurement of confounders and effect modifiers was not conducted) besides the actual intervention. Finally, comparisons could not be drawn between the results of this study and other research given the fact that no other Quebec, or Canadian, research on TESL student teachers' computer-training needs was available.

5.5 Suggestions for Future Research

This research set out to identify and describe TESL student teachers' needs in terms of computer-training. It also assessed the impact of a needs-based methodology in meeting the computer-training needs of student teachers. It remains for future studies to replicate this work, taking into consideration some of the revisions suggested below.

Increasing the sample size would make the results more generalizable to other TESL student teachers. As the number of student teachers enrolled in one computer-training course is often limited by the size of the computer lab, increasing the sample size could be achieved by surveying TESL student teachers in other institutions and those in other subject specialities as well. This would allow for comparisons within subject speciality and among subject specialities. One study found that the key factor in the use of information and communication technologies was subject speciality, and modern languages were among those specialties with the lowest use (Cuckle, Clarke & Jenkins, 2000).

Revising the Needs Assessment and the Self-Assessment Task is recommended. To improve the reliability of the NAs, revisions should include using more definitions and examples for some of the skills and knowledge items. Furthermore, as technology and pedagogy change, consultation with experts to more accurately determine the appropriateness of certain items, in particular those in Section LL, is necessary. To better understand the student teachers' reactions to the intervention, more specific open-ended questions in the post-NA are required. The student teachers' reactions to certain pedagogical approaches within the needs-based training methodology could be examined with the following questions: "What types of computer-lab activities are the most effective?", "How useful is the alternative midterm-exam assessment?", "Do you require more or less conferencing time?, and How helpful is it to provide you with model assignment?". An open-ended question on the usefulness of the various types of modeling (teacher, teaching-assistant and guests) needs to be asked so as to address the second part of the modeling-opportunities research question. The Self-Assessment tool

could be refined so that the task requires student teachers to evaluate their progress using the actual research questions as guidelines; this would make the resulting comments even more pertinent.

The advantage of incorporating other qualitative measures is in the diversity of the evidence. For example, there is data-rich information on the Post-Internship Survey (see Appendix E, p. 134). Although some of the data were used to address the research question on modeling opportunities, the information on attitudes, skills and knowledge was not examined. This Survey has particular value given the timing of the questionnaire; it was distributed immediately after the student teachers had completed their placements. Additionally, using attendance figures might show that a high-attendance rate is a key factor in how effective the needs-based training methodology is. Finally, conducting interviews with a sample of student teachers may provide valuable insight into ways by which to improve the intervention for diversity of evidence lends support to the interpretation of and conclusions drawn from research results (Erikson, 1991). For example, the transcripts form the interviews could be analysed to see which comments directly attributed change to the intervention, as opposed to other factors.

Validation of the NA, the inclusion of a control group and assessment of learner-specific characteristics would facilitate the identification and measurement of TESL student teachers' computer-training needs. Validation of the NA measurement tool should be conducted to evaluate the appropriateness of the content. In an intervention study, the inclusion of a control group allows for comparison of the intervention group and the non-intervention group, while still permitting within-group comparison. The advantage of this is the potential to assess whether the observed effects of the

intervention are actually attributable to the intervention itself. Using the demographic information from Study 2, along with a larger sample of student teachers, groups related to gender, age and future teaching intentions could be formed. These groups could then be examined for similarities and differences in terms of their computer-training needs, and the impact of the intervention on these needs.

5.6 Conclusion

Although a greater percentage of student teachers in Study 1 than Study 2 came to the course with attitude concerns, both studies indicated that anxiety, negative attitude and low-skill level were considerable issues for some of the student teachers. Despite the fact that the quantitative measures in both studies showed little attitude change from pre to post, the qualitative data show that many student teachers had a positive attitude change and that the majority expressed an intention to use computers in their future teaching. The noted improvements in skill and knowledge may perhaps be associated with a more positive attitude toward the use of computers. Thus, the important improvements noted in computer skills and knowledge for both studies may be interpreted as an indirect measure of positive attitude change.

Participating student teachers also self-reported deficits in both computer skill and knowledge. All skills and knowledge items measured by the NAs showed student-teacher progression upon completion of the course. One item, which measured overall skills specific to using computers in language learning, improved more than the item which measured overall general skills. Although the Study 1 data were less rigorously tested, the results of Study 1 mirror those of Study 2. In fact, the results in this area were

the most similar across studies, except that an even greater positive change was noted in Study 2. Further analysis in Study 2 found that the student teachers' abilities to implement various types of TESL pedagogy within computers and language learning situations were quite strong, while these same items were rated as very important course content. The 19 skills and knowledge items were also assessed as being important course content. Overall, the skills and knowledge findings are the most dependable results in this study as they were the most rigorously tested in terms of types and variety of measures.

Although student teachers in Study 1 had fewer modeling opportunities while in placement than those in Study 2, both groups were lacking in this area. There is a need for more frequent and higher quality modeling among faculty and supervising teachers. As there were no specific measurement tools to examine whether the actual training led to changes in modeling opportunities, no conclusions can be made in this area. Future research will have to measure the effectiveness of the many modeling opportunities given to the student teachers during the course. Nonetheless, it is not necessary to wait for the results of future research to address the present problem: a lack of modeling opportunities for TESL student teachers.

Despite the exploratory nature of Study 1, many of its findings are similar to the results in Study 2. With the exception of one important difference in the attitude findings and another in the modeling results, the tendencies in Study 1 are present in Study 2. Many of the patterns observed in Study 1 however are clearer and stronger in Study 2. These patterns are powerful resources to guide recommendations for training and future research, while taking the limits of the research into consideration. These

recommendations consist of offering more modeling opportunities, adopting a model which promotes technology infusion, using a course design which includes needs training, assessing learners' needs, and integrating the MEQ competencies. It is up to future research to address some of the limits in this work and to expand our knowledge of this area. For as the potential offered by computers in language learning continues to evolve, so too must our future TESL teachers "to be able to exercise firm control over the content of the activities and ensure that they allow the students to develop the target competencies" (Quebec Ministry of Education, 2001, pp. 97-98).

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Appendix A: Pre Needs-Assessment for Computers in Language Learning (Study 1)

Please take the time to complete this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous. Thanks for your help!

Section One: Please select the option which best describes you.

My feelings about using computers in general are

○ very positive ○ positive ○ neutral ○ negative

My computer skills in general are

○ excellent ○ good ○ average ○ below average

My feelings about using computers in language learning are

○ very positive ○ positive ○ neutral ○ negative

My computers skills as applied to language-learning activities are

○ excellent ○ good ○ average ○ below average

Section Two: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5 (1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My knowledge/skills	**Should be covered in the course**
Understanding Concordia's computer technology	1 2 3 4 5	1 2 3 4 5
Understanding how computers work in general	1 2 3 4 5	1 2 3 4 5
Using a PC	1 2 3 4 5	1 2 3 4 5
Using a Mac	1 2 3 4 5	1 2 3 4 5
Using a scanner	1 2 3 4 5	1 2 3 4 5
Using Language-learning software	1 2 3 4 5	1 2 3 4 5
Using CD-ROMs	1 2 3 4 5	1 2 3 4 5
Using word-processing software	1 2 3 4 5	1 2 3 4 5
Using Excel	1 2 3 4 5	1 2 3 4 5
Using PowerPoint/other presentation software	1 2 3 4 5	1 2 3 4 5
Using publishing software for school projects	1 2 3 4 5	1 2 3 4 5
Using the Internet for research	1 2 3 4 5	1 2 3 4 5
Finding language-learning resources on the Internet	1 2 3 4 5	1 2 3 4 5
Using email	1 2 3 4 5	1 2 3 4 5
Using news groups	1 2 3 4 5	1 2 3 4 5
Chatting on-line	1 2 3 4 5	1 2 3 4 5
Setting up a discussion board	1 2 3 4 5	1 2 3 4 5
Building a web page	1 2 3 4 5	1 2 3 4 5

Section Three: Please answer the following questions.

Describe the various types of computer technology (number, type, age and power of computers, software, Internet access) available in your placement school(s)?

Have you heard about, tried or worked with a teacher who has used computers in language learning? If so, please describe the activities.

Do you have any concerns about this course? If so, please elaborate.

Do you have any course-content, pedagogical-approach or evaluation suggestions for this course? If so, please elaborate.

Any additional comments?

Appendix B: Post-NA for Computers in Language Learning (Study 1)

Please take the time to complete this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous. Thanks for your help!

Section One: Please select the option which best describes you.

My feelings about using computers in general are

○ very positive ○ positive ○ neutral ○ negative

My computer skills in general are

○ excellent ○ good ○ average ○ below average

My feelings about using computers in language learning are

○ very positive ○ positive ○ neutral ○ negative

My computers skills as applied to language-learning activities are

○ excellent ○ good ○ average ○ below average

Section 2: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5 (1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My knowledge/skills	Should be covered in the course
Understanding Concordia's computer resources	1 2 3 4 5	1 2 3 4 5
Understanding how computers work in general	1 2 3 4 5	1 2 3 4 5
Using a PC	1 2 3 4 5	1 2 3 4 5
Using a Mac	1 2 3 4 5	1 2 3 4 5
Using a scanner	1 2 3 4 5	1 2 3 4 5
Using Language-learning software	1 2 3 4 5	1 2 3 4 5
Using CD-ROMs	1 2 3 4 5	1 2 3 4 5
Using word-processing software	1 2 3 4 5	1 2 3 4 5
Using Excel	1 2 3 4 5	1 2 3 4 5
Using PowerPoint	1 2 3 4 5	1 2 3 4 5
Using publishing software for school projects	1 2 3 4 5	1 2 3 4 5
Using the Internet for research	1 2 3 4 5	1 2 3 4 5
Finding language-learning resources on the Internet	1 2 3 4 5	1 2 3 4 5
Using email	1 2 3 4 5	1 2 3 4 5
Using news groups	1 2 3 4 5	1 2 3 4 5
Using a discussion board	1 2 3 4 5	1 2 3 4 5
Chatting on the Internet	1 2 3 4 5	1 2 3 4 5
Building a web page	1 2 3 4 5	1 2 3 4 5

Section LL: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5
(1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My know./skills	**Should be in the course**
Understanding technological requirements within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Understanding special populations within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Understanding management concerns within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using whole-class activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using small-group activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using individual activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using collaborative learning within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using the communicative approach within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using form-focused input within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Choosing effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Using effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Creating effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
Determining learning objectives within computers in LL situations	1 2 3 4 5	1 2 3 4 5

Section Three: Please answer the following questions.

Before this course, what was your opinion (educational philosophy) on using computers in LL?

_____
_____
_____
_____

Now that the course is almost over, has your opinion (educational philosophy) on using computers in LL changed? Please state your changed opinion OR explain why your opinion has not changed.

_____
_____
_____
_____

Will you use computers in LL? If yes, what types of activities and how frequently? If no, why not?

_____
_____
_____
_____

How would you improve this course (content, approach, work load, evaluation)? Please feel free to include any additional comments.

_____
_____
_____
_____

Appendix C: Pre-NA for Computers in Language Learning (Study 2)

On your OWN, please take the time (15 to 20 minute) to complete ALL items on this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous.

Thanks very much for your help!

A) Name (Choose a 3 to five letter code name which you will remember such as Bob, Cat or Tin.)

_____

B) Gender

_____

C) Mother Tongue

_____

D) How many languages do you speak well?

_____

E) How old are you?

_____

F) List your program and the session that you are currently completing.

_____

G) What age group(s) would you like to teach?

_____

Needs Assessment for Computers in Language Learning

Please take the time to complete this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous. Thanks for your help!

Section One: Please select the option which best describes you.

1) My feelings about using computers in general are
   ○ very positive ○ positive ○ neutral ○ negative

2) My computer skills in general are
   ○ excellent ○ good ○ average ○ below average

3) My feelings about using computers in language learning are
   ○ very positive ○ positive ○ neutral ○ negative

4) My computers skills as applied to language-learning activities are
   ○ excellent ○ good ○ average ○ below average

Section Two: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5
(1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My knowledge/skills	**Should be covered in the course.**
5/6 Understanding Concordia' computer technology	1 2 3 4 5	1 2 3 4 5
7/8 Understanding how computers work in general	1 2 3 4 5	1 2 3 4 5
9/10 Using a PC	1 2 3 4 5	1 2 3 4 5
11/12 Using a Mac	1 2 3 4 5	1 2 3 4 5
13/14 Using a scanner	1 2 3 4 5	1 2 3 4 5
15/16 Using CD-ROMs	1 2 3 4 5	1 2 3 4 5
17/18 Using Language-learning software	1 2 3 4 5	1 2 3 4 5
19/20 Using word-processing software	1 2 3 4 5	1 2 3 4 5
21/22 Using spreadsheets ex. Excel	1 2 3 4 5	1 2 3 4 5
23/24 Using presentation software ex. Power Point	1 2 3 4 5	1 2 3 4 5
25/26 Using publishing software for school projects	1 2 3 4 5	1 2 3 4 5
27/28 Using the Internet for research	1 2 3 4 5	1 2 3 4 5
29/30 Finding TESL resources on the Internet	1 2 3 4 5	1 2 3 4 5
31/32 Assessing TESL resources on the Internet	1 2 3 4 5	1 2 3 4 5
33/34 Using email	1 2 3 4 5	1 2 3 4 5
35/36 Using news groups (a group of people share emails on a specific topic)	1 2 3 4 5	1 2 3 4 5
37/38 Chatting on-line	1 2 3 4 5	1 2 3 4 5
39/40 Setting up a news group	1 2 3 4 5	1 2 3 4 5
41/42 Building a web page	1 2 3 4 5	1 2 3 4 5

Section Three: Please answer the following questions.

43) Have you completed a placement ('stage')? If yes, please answer question 44.

44) Describe the various types of computer technology (number in school/lab/classroom, type, age and power of computers, software, Internet access) available in your placement school(s)?

45) Have you heard about, tried or worked with a teacher who has used computers in language learning? If so, please describe the activities.

46) Do you have any concerns about this course? If so, please elaborate.

47) Do you have any course-content, pedagogical-approach or evaluation suggestions for this course? If so, please elaborate.

48) Any additional comments?

Appendix D: Post-NA for Computers in Language Learning (Study 2)

Please take the time to complete this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous. Thanks for your help!

Code Name :

Section One: Please select the option which best describes you.

1) My feelings about using computers in general are
O very positive O positive O neutral O negative

2) My computer skills in general are
O excellent O good O average O below average

3) My feelings about using computers in language learning are
O very positive O positive O neutral O negative

4) My computers skills as applied to language-learning activities are
O excellent O good O average O below average

Section Two: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5 (1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My knowledge/skills	**Should be covered in the course.**
5/6 Understanding Concordia's computer resources	1 2 3 4 5	1 2 3 4 5
7/8 Understanding how computers work in general	1 2 3 4 5	1 2 3 4 5
9/10 Using a PC	1 2 3 4 5	1 2 3 4 5
11/12 Using a Mac	1 2 3 4 5	1 2 3 4 5
13/14 Using a scanner	1 2 3 4 5	1 2 3 4 5
15/16 Using CD-ROMs	1 2 3 4 5	1 2 3 4 5
17/18 Using Language-learning software	1 2 3 4 5	1 2 3 4 5
19/20 Using word-processing software	1 2 3 4 5	1 2 3 4 5
21/22 Using spreadsheets ex. Excel	1 2 3 4 5	1 2 3 4 5
23/24 Using presentation software ex. PowerPoint	1 2 3 4 5	1 2 3 4 5
25/26 Using publishing skills for school projects	1 2 3 4 5	1 2 3 4 5
27/28 Using the Internet for research	1 2 3 4 5	1 2 3 4 5
29/30 Finding TESL resources on the Internet	1 2 3 4 5	1 2 3 4 5
31/32 Assessing TESL resources on the Internet	1 2 3 4 5	1 2 3 4 5
33/34 Using email	1 2 3 4 5	1 2 3 4 5
35/36 Using news groups (a group of people share emails on a specific topic)	1 2 3 4 5	1 2 3 4 5
37/38 Chatting on-line	1 2 3 4 5	1 2 3 4 5
39/40 Setting up a news group	1 2 3 4 5	1 2 3 4 5
41/42 Building a web page	1 2 3 4 5	1 2 3 4 5

N.B. LL = language learning

Section LL: Please rate the following 'My knowledge/skills' items on a scale of 1 to 5 (1 = excellent, 2 = good, 3 = average, 4 = below average, 5 = non existent).

Please rate the following 'Should be covered in the course' items on a scale of 1 to 5 (1 = extremely important, 2 = very important, 3 = important, 4 = not very important, 5 = not important at all).

	My know./skills	Should be in the course
A) Understanding technological requirements within computers in LL situations	1 2 3 4 5	1 2 3 4 5
B) Understanding management concerns within computers in LL situations	1 2 3 4 5	1 2 3 4 5
C) Understanding special populations within computers in LL situations	1 2 3 4 5	1 2 3 4 5
D) Using whole-class activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
E) Using small-group activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
F) Using individual activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
G) Using collaborative learning within computers in LL situations	1 2 3 4 5	1 2 3 4 5
H) Using the communicative approach within computers in LL situations	1 2 3 4 5	1 2 3 4 5
I) Using form-focused input within computers in LL situations	1 2 3 4 5	1 2 3 4 5
J) Choosing effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
K)Creating effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
L) Using effective LL activities within computers in LL situations	1 2 3 4 5	1 2 3 4 5
M) Determining learning objectives within computers in LL situations	1 2 3 4 5	1 2 3 4 5

Section Three: Please answer the following questions.

N) Before this course, what **WAS** your opinion (educational philosophy) on using computers in LL?

_____

_____

_____

_____

O) Now that the course is almost over, **HAS** your opinion (educational philosophy) on using computers in LL **CHANGED**? Please state your changed opinion **OR** explain why your opinion has not changed.

_____

_____

_____

_____

P) Will you use computers in LL? If yes, what types of activities and how frequently? If no, why not?

_____

_____

_____

_____

Q) How would you improve this course (content, approach, work load, evaluation)? Please feel free to include any additional comments.

_____

_____

Appendix E: Post-Internship Survey for Computers in Language Learning

Please take the time to complete this questionnaire. The information will be used for course preparation and thesis work; the answers are anonymous. Thanks for your help!

A) I completed the Computers in Language Learning course

○ Winter 2001 ○ Fall 2001 ○ Other

B) If you completed the course this session (Fall 2001), what is your nickname?

_____

Please select the option which best describes you.

1) My feelings about using computers in general are

○ very positive ○ positive ○ neutral ○ negative

2) My computer skills in general are

○ excellent ○ good ○ average ○ below average

3) My feelings about using computers in language learning are

○ very positive ○ positive ○ neutral ○ negative

4) My computers skills as applied to language-learning activities are

○ excellent ○ good ○ average ○ below average

Please answer the following questions (only refer to the placement you JUST completed).

5) Describe the **computer** technology (number in school, number per classroom, type, power, Internet access, types of software) in your placement school.

_____

_____

_____

_____

6) Does your placement school have a web page?

_____

7) Does your cooperating teacher have a web page?

_____

*** 8) While in placement, did you observe your cooperating teacher using computers (preparing lessons, creating documents, tracking attendance and marks, having students play games or do independent work, teaching activities)? If yes, **explain how** s/he used computers.

_____
_____
_____
_____

9) While in placement, did you use computers (preparing lessons, creating documents, tracking attendance and marks, having students play games or do independent work, teaching activities)? If yes, **explain how** you used computers.

_____
_____
_____
_____

10) After you graduate, will you use computers (preparing lessons, creating documents, tracking attendance and marks, having students play games or do independent work, teaching activities,) in your teaching? If yes, **explain how** you will use them.

_____
_____
_____
_____

Thank you for answering this survey!

*** Item eight was retained for analysis in this thesis.

Appendix F: Course Outline

Computers in Language Learning
TESL 330

Professor:	Laura King
Session:	Autumn 2001
Wh + Wh:	Mon. + Wed. 11:245 – 2:30, H-609
Phone:	(514) 844 – 2174
E-mail:	laura.king@education.concordia.ca
Office:	EN 4th floor (turn left, end of hallway) or a designated lab
Office Hours:	To be determined by the class, also available by appointment

INTRODUCTION

This course is designed for undergraduate students who are studying in the TESL department.

GENERAL OBJECTIVE

The goal is to acquire the skills and confidence necessary to integrate computers in the preparation and delivery of pedagogical activities for language learning and professional development purposes.

SPECIFIC OBJECTIVES

Demonstrate critical judgment regarding the real benefits and limitations of computers as language learning (LL) teaching and learning resources

Demonstrate a general understanding of the possibilities offered by computers (and the Internet in particular) for teaching and learning, and how to integrate computers into pedagogical activities

Assess the instructional potential of computer applications and networking technology in relationship to the development of the competencies targeted in the programs of study

Recognize the people, activities and organizations which encourage the integration of computers into school systems and LL classrooms

Use computers effectively in different aspects of your professional life: communication, teaching, research, information processing, evaluation, interaction with colleagues and experts

Use the possibilities offered by on-line networks for information sharing and collaborative projects

Transmit your ability to use computers to students in order to support the collective construction of learning in a well-structured, critical manner

CONTENT

Understanding Concordia's computer technology and how computers work in general
Using PCs and Macs
Using scanners, CD-ROMs and word-processing software for LL purposes
Using spreadsheet software for student evaluation
Using presentation software for teaching
Using publishing software for school projects
Using LL software in the classroom
Using the Internet for LL resources and student research
Using email (First Class) and keypalling
Using news groups and chatting on-line with your students

Building a web page with and for your students
Examining management concerns and special populations in regards to computers
Integrating computers into a variety of LL contexts
Determining learning objectives within computers and LL situations
Creating and sharing effective LL activities within computers in LL contexts

METHODOLOGY

Do not work on me. Work with me.

This course is designed to help you use information and communication technologies (ICT) creatively, intelligently and responsibly with your future students and colleagues. Working with and not "on" someone creates different teaching and learning challenges for everyone involved. Over the next 8 weeks, we will be working with a variety of approaches and practices that facilitate the effective use ICT in the LL classroom. As well, you will be offered the opportunity to reflect, act on and articulate your personal philosophy about learning languages and using computers.

The teacher provides preparation, monitoring and analysis of all the course work as well as formative and summative feedback on student performance. This includes lectures, lab activities, guest presentations, homework, individual and group work, self, peer and teacher evaluation, assignments, formative quizzes, a midterm exam, a final project and student presentations. All work increases in level of difficulty and skill as the term progresses so that students are adequately prepared to make a classroom presentation, complete a final project and use computers in the LL classroom.

STUDENT, TA AND TEACHER RESPONSIBILITIES

Please remember that we are working together throughout this course. Teaching and learning are social, collaborative efforts with built-in unpredictability. Do not hesitate to discuss any issues or concerns as soon as they arise. Here are the things I especially expect of you:

Be on time, present and be yourself.

Be prepared to self, peer and teacher evaluate.

Embrace the potential of using computers in your LL teaching.

Work consistently and diligently over the next 8 weeks.

Hand in well-presented, creative and intelligent work on time (- 10% for the first late assignment, -20% for the second late assignment, a third late assignment will not be accepted).

Be energetic, inspiring, fair, collaborative, courageous in your beliefs and actions, visible in your work, intrigued by differences, challenged by risk, empathetic with

human frailty, devoted to the extraordinarily unpredictable arts of teaching and learning.

EVALUATION

60 % Class Activities – to be completed throughout the term

Lesson Plans (20%) – Create a lesson plan which effectively integrates computers into a LL situation - Lesson Plan 1 (Sept.17, 10%), Lesson Plan 2 (Oct. 10, 10%)

Personal Reflections (15%) – Respond to lectures, lab work and readings – Reflection 1 (Sept.12, 5%), Reflection 2 (Sept. 26, 5%), Reflection 3 (Oct. 17, 5%)

Self-Assessment (5%) – Evaluate your participation in lectures, lab and group work – Nov. 2

Midterm Exam (20%)– Create exam questions and answer keys in a group (Part 1, Oct. 1, 10%) and assess individual answers using the answer keys (Part 2, Oct. 10, 10%)

Presentation (15%), Final Project (25%) – Complete and present a project that effectively integrates computers into LL - presentations on Oct. 29 and 31, projects due on Oct. 31
The topics and objectives for the presentation and project are set by the teacher and the students.

Communication Bonus – Hand in exchanges with a 'new' Internet friend, asynchronous or synchronous communication, which focus on key aspects of LL - Oct. 22, the bonus marks replace your lowest five marks

During the second week, students will receive a detailed syllabus which includes weekly course content, assignment explanations and evaluation criteria, lab schedules and access to the course web page which includes course materials and assignment models.

REQUIRED MATERIALS

Computer Access (at home, work or school)

Internet Access (at home, work or school)

Email Account (Use First Class)

Disks (bring to class)

50 dollars (bring 15$ for photocopies to the second class)
Note that the remaining 35$ is used for making your own additional photocopies and printing out your own readings.

Appendix G: Course Syllabus

Computers in Language Learning Syllabus

TESL Undergraduate Grading System

97 – 100	A+ (outstanding)
94 –96	A
90 – 93	A-
85 – 89	B+ (very good)
80 – 84	B
75 – 79	B-
70 – 74	C+ (satisfactory)
65 – 69	C
60 – 64	C- (pass)
57 – 59	D+ (marginal pass)
53 – 56	D
50 – 52	D-
0 – 49	F (failure)

- Lecture 1 (Sept. 5)

Ice-breakers
Course Outline
Computer Basics + Rational
Computers + LL Link

- Lecture 2 (Sept. 10)

Syllabus and Reflection Guidelines
MEQ Competencies
Readings Discussion
Lab – keypalling – part 1

- Lecture 3 (Sept. 12) - Reflection 1 (5%)

Lesson Plan Guidelines
Group Work – Competencies + Lesson planning
Keypalling - Action Research Presentation + Discussion
Lab – keypalling – part 2

- Lecture 4 (Sept. 17)

The Virtual Classroom – Tour + Tasks (Guest Lecturer: Patrick Devey)
Language-Learning Lab – Tour + Tasks (Guest Lecturer: Patrick Devey)
Collaborative Learning Part 1 + Group Work

- Lecture 5 (Sept. 19) – Lesson Plan 1 (10%)

Reflection 2 Guidelines
Collaborative Learning Part 2 + Group Work
Lab – Presentation Software (PP)

- Lecture 6 (Sept. 24)

Management Concerns (individual vs. group, classroom vs. laboratory)
Special Populations
Lab – Spreadsheets and Evaluation

- Lecture 7 (Sept. 26) – Reflection 2 (5%)

Midterm Exam Guidelines
Critically assessing LL sites
Exchanging web sites
Lab – Building a web page – (Guest Lecturer: Patrick Peachey)

- Lecture 8 (Oct. 1) - Midterm Exam Part 1 (10%)

Final Presentation and Project Discussion
Group Work – Creating exam questions and answer keys
Lab – Finalizing answer keys

- Lecture 9 (Oct. 3) – Go to LB 211.

Introduction, Connecting from home + Demonstrations
Using index and full-text databases for research
(Guest Lecturer : Librarian)

- Lecture 10 (Oct. 10) - Lesson Plan 2 (10%), Midterm Exam Part 2 (10%)

Group Work – Assessing exam questions using answer keys
Lab – Building a web page – part 2

- Lecture 11 (Oct. 15)

Using the Internet to Teach – (Guest Lecturer: Melvin Shantz)

- Lecture 12 (Oct. 17) - Reflection 3 (5%)

What do the publishers have? - (Guest Lecturer: Publisher Presentation)
What is free? What can we share?
Lab – Publishing for school projects

- Lecture 13 (Oct. 22) – Communication Bonus

Building Web Pages
Working on Final Projects
Computer Skill Development – news groups, discussion board, chatting

- Lecture 14 (Oct. 24)

Conferencing with Teacher
Lab – Project Support and Skill Development

- Lecture 15 (Oct. 29) – Presentations (15%)

Student Presentations
Course Evaluation

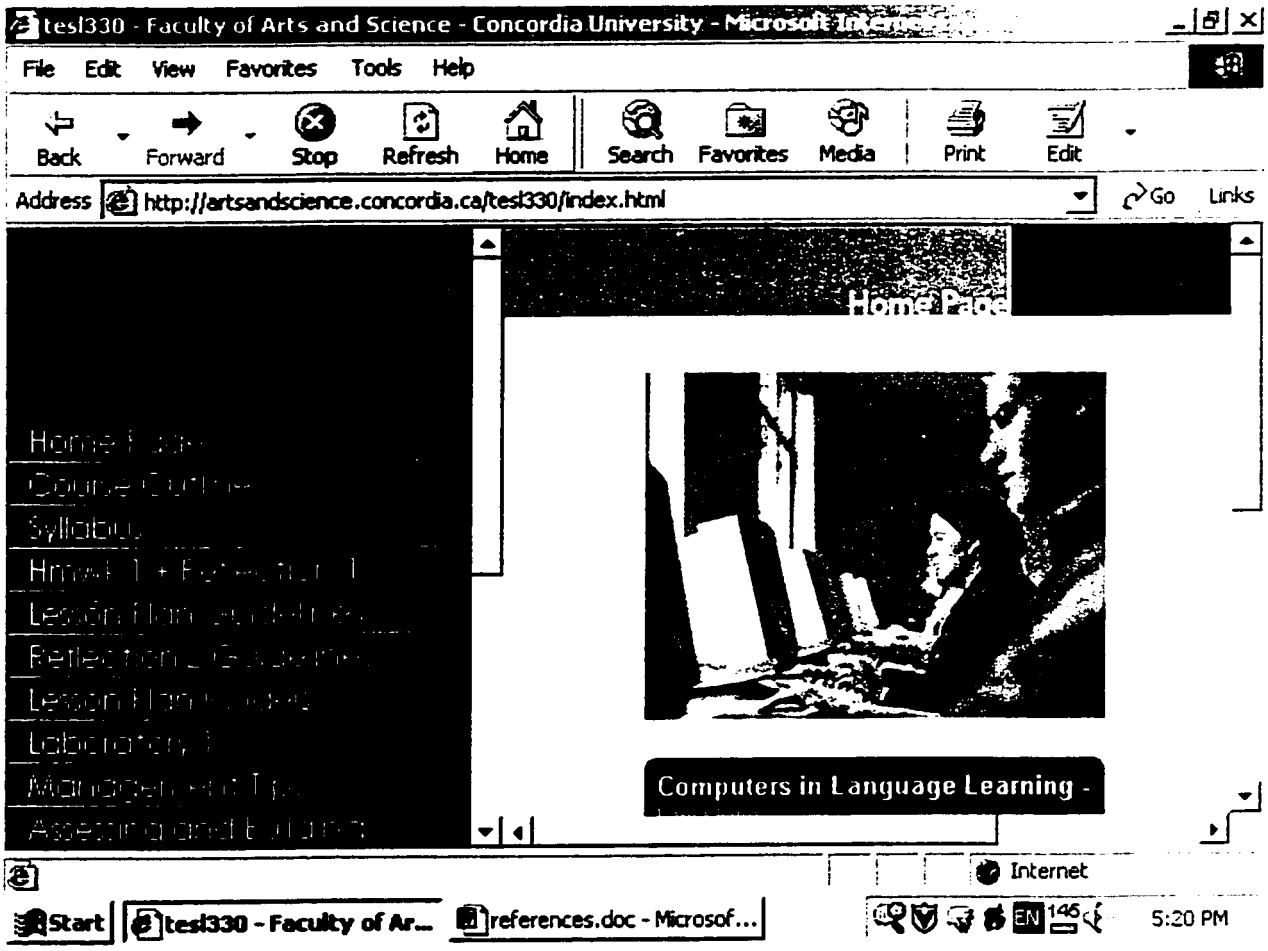
- Lecture 16 (Oct. 31) – Presentations (15%) – Project (25%)

Student Presentations
Hand in projects and post-survey needs assessment.
Good-byes

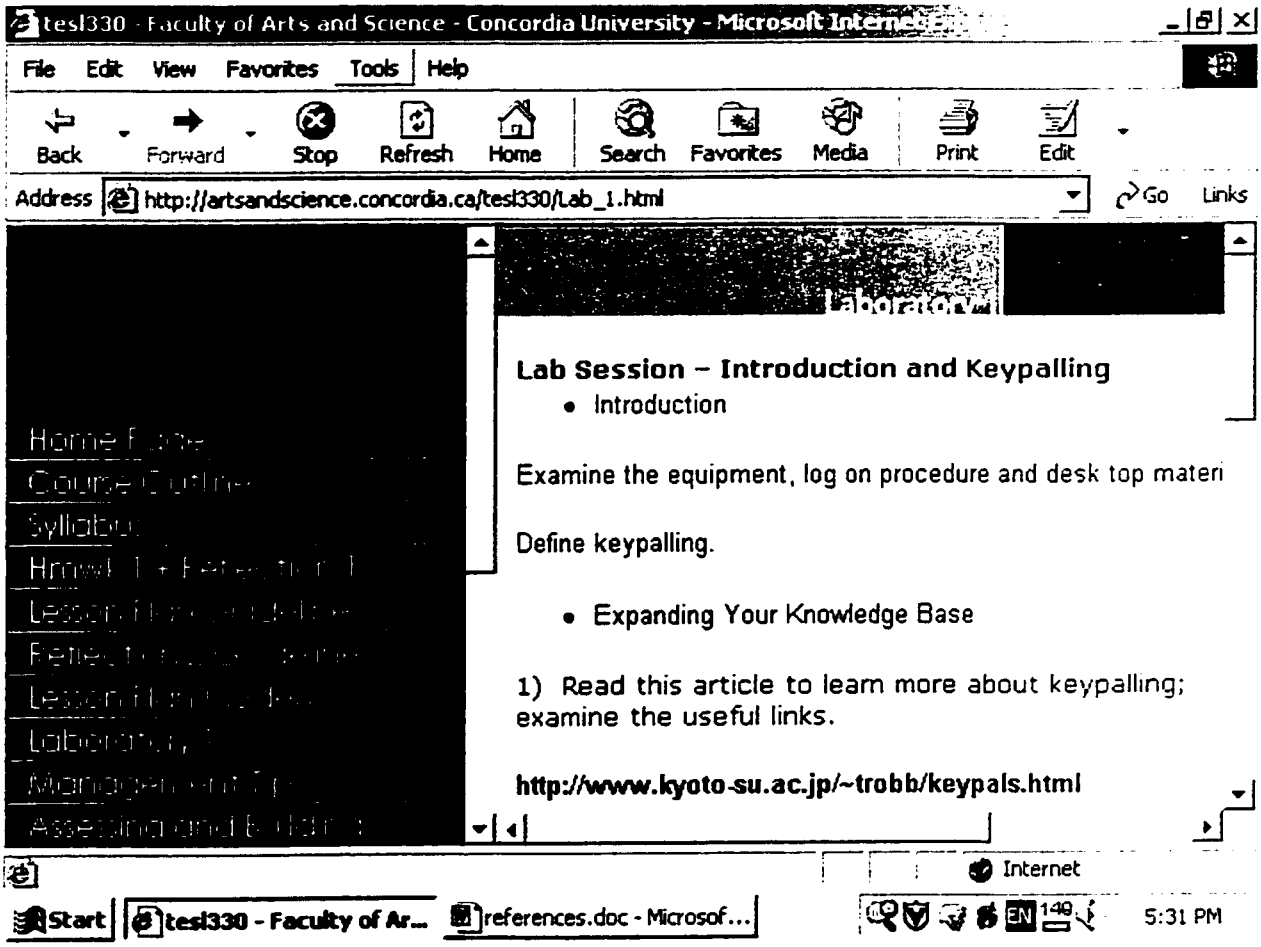
- November 2 – Self- Assessment (5%)

Note that each lecture includes homework tasks such as reading articles, completing assignments, preparing for the mid-term exam, reflecting on readings and course content, acquiring new skills, giving feedback (self, peers, TA, teacher, guests), and working on the final presentation and project.

Appendix H: Course Home Page



Appendix I: Sample Computer-Lab Tasks



Lab Session – Introduction and Keypalling

- Introduction

Examine the equipment, log on procedure and desk top material.
Define keypalling.

- Expanding Your Knowledge Base

1) Read this article to learn more about keypalling; examine the useful links.
http://www.kyoto-su.ac.jp/~trobb/keypals.html

2) See how one teacher sets up his keypalling project.
http://internet-1.claurendeau.qc.ca/langues/Pages/english/keypalinstruct.htm

3) Imagine a teaching scenario (age, level, time per day/week learning English) and find suitable classroom email sites (Use links form article 1and search with key words like keypal, epal, ESL, or use a key site like Dave Sperling's page. You could use multi-search engines like www.dogpile.com or www.google.com

Save your discoveries or email them to yourself.

Find your own keypal, begin to communicate and note discussion topics which your students could also use.

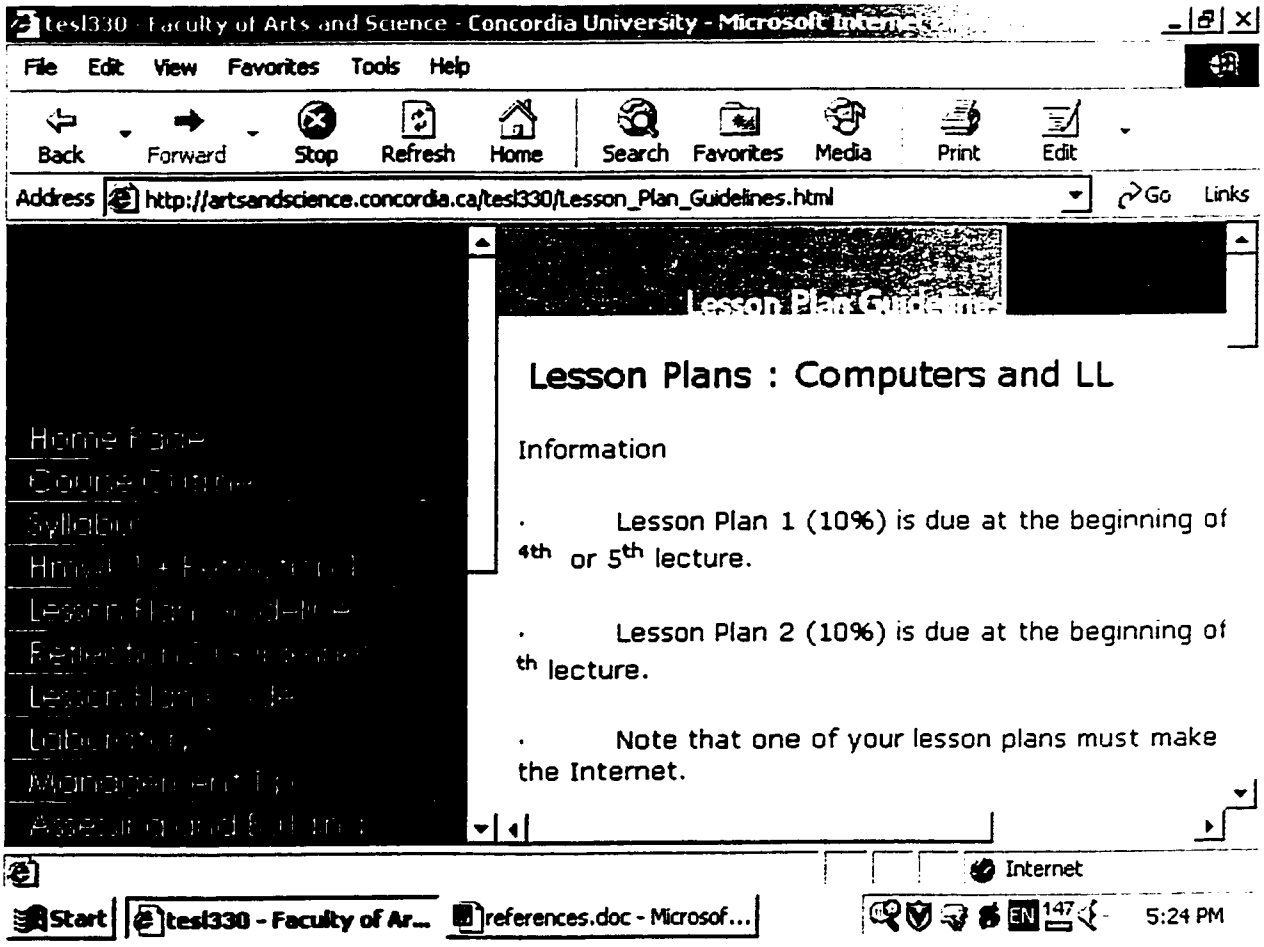
4) Read this action research: http://www.magma.ca/~leking/keypalling.htm

Focus on methodology, advantages and concerns.

*** Offer any keypalling 'discoveries' to your lab group.

To be continued on Wednesday...

Appendix J: Sample Assignment



Lesson Plans : Computers and LL

- Information

Lesson Plan 1 (10%) is due at the beginning of the 4th or 5th lecture.

Lesson Plan 2 (10%) is due at the beginning of the 10th lecture.

Note that one of your lesson plans must make use of the Internet.

- Task

On your own, or in a group of two to three people, decide how you would use computers in a LL situation. Your collaborative and communicative ideas must be an integral part of one lesson or may play a role in a number of lessons. Note that your enticing activities should include effective LL pedagogy such as form-focused input and information-gap activities.

Consider the following examples: information-gathering and sharing via the Internet (group projects), communication activities with the Internet (collaborative chatting and emailing ideas); competency skills with the Internet (listening, reading, speaking, writing); word-processing potential re the writing process (create a group story); publishing (complete a class newspaper); spreadsheets, data bases and concordances (vocabulary) and LL software (games, problem-solving, LL skills).

List the following criteria: learning objectives/competencies (use the MEQ guidelines if you are focusing on the primary and secondary levels), age, group size, level, independent versus teacher guided, classroom versus lab, time per lesson and technological requirements. Describe the computer tools and the LL activities. Although you are encouraged to use all available resources on the Internet and LL software, you must 'personalize' your 'discoveries' so that there is a significant 'original' aspect to your project. Rationalize your 'originality' in two to four sentences at the bottom of your lesson plan.

Please reference all sources using the APA format. For information on how to reference on-line sources see http://www.library.ubc.ca/hss/citelso.html#apa

Your reflection should be 2 to 4 pages (12, double paced).

- Starting Points

Talk to your teacher or TA.

Examine models.

Consider keypalling to be an example of an effective Internet project.

Reflect on readings and course content.

Read *The Internet for English Teaching: Guidelines for Teachers* (http://www.aitech.ac.jp/~iteslj/Articles/Warschauer-Internet.html)and *On the Net: Sites for Soar(ing) Eyes* (http://llt.msu.edu/vol5num1/onthenet/default.html).

- Evaluation Criteria

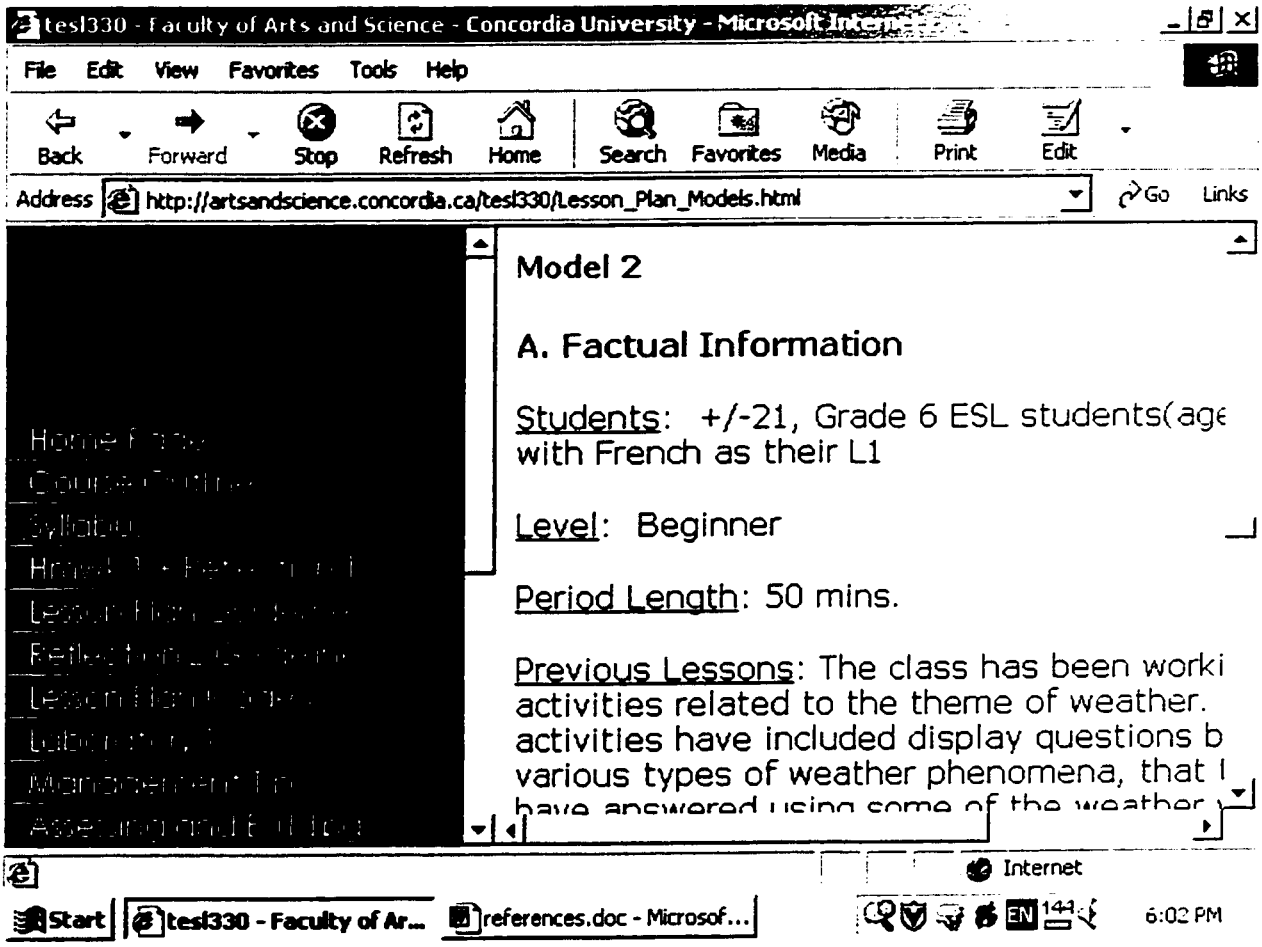
Computer Application + LL link (5 marks)

Creativity/originality (2.5 marks)

Complete, clear, accurate (2.5 marks)

- Note that if you choose to focus on keypalling that your activities should demonstrate an enhanced understanding of the material covered in class.

Appendix K: Exemplary Work Sample



Model 2

A Factual Information

Students: +/-21, Grade 6 ESL students(ages 10-12) with French as their L1
Level: Beginner
Period Length: 50 mins.
Previous Lessons: The class has been working on various activities related to the theme of weather. These activities have included display questions based upon various types of weather phenomena, that the students have answered using some of the weather vocabulary which has been provided for them.
Independent vs. Teacher Guided: While this project begins as largely teacher guided, it is assumed that it will soon become one on which the students will work independently, within their groups.
Classroom vs. Lab: The students will likely need at least two periods in the lab to account for browsing and printing time. Posters will be worked on in the classroom.

B. Objectives and Problems

Topic Area / Theme: The Weather
General Aims: To improve the learner's ability to decode material presented to them in English, specifically, in this case, information about weather as found on Internet sites.
Specific Objectives:

As per MEQ guidelines:

-Students will be able to understand and transmit information on topics beyond their immediate environment.

The components of that objective are:

1. Identification of a topic: person, animal, object, event, place.
2. Short description of the topic: main features, facts and observations.
3. Brief personal response to the topic: impressions, opinions, etc.

Linguistic Content:

Old vocabulary: Includes the name of various types of weather, i.e. sunny, cloudy, hot, cold, snow, rain, etc. as well as some of the vocabulary learned previously especially from units on clothing and outdoor activities

New vocabulary: New weather vocabulary will include; temperature (in degrees Celsius) vs. weather ("what it's doing outside" i.e. raining), forecast, fog, UV index, etc.

Grammar/Structure: The grammar used in these weather reports, while condensed, is fairly straight forward and shouldn't pose any serious problems for the students.

Pronunciation: Nothing too challenging

Anticipated Problems: While many of these students have experience in using computers, some may encounter difficulties in navigating the intended sites. It may also prove difficult to keep the students on task.

C. Materials and Aids

Computer lab: with at least seven (7) computers with Internet access, and a (colour) printer
Internet tools:
Students would have to search on the following sites to find the required information:
-The weather Network:
http://www.theweathernetwork.com
-The weather Channel:
http://www.weather.com
-Yahoo! Weather:
http://weather.yahoo.com
-Sears Canada:
http://www.sears.ca
-The Bay:
http://www.thebay.com
-Les Ailes de la Mode:
http://www.lesailes.com/Les_Ailes/index_2.html
-Little explorers (Picture dictionary)
http://www.EnchantedLearning.com/Dictionary.html
-The Sporting News:
http://www.sportingnews.com
-Or other applicable sites.

D. Structure of the Lesson

Warm-up Activity #1: Review of some of the "weather words" that the students have seen and heard so far. Display questions about the date, including; day of the week, date, month, and year, as well as questions about the weather of that particular day, i.e. "What is the weather like today?" "What is it doing outside, today?"
Introduction of the Project: At this time the students will be given an explanation as to what is expected from them for this project. It will be explained to them that they will be "grouped by threes" and that each group will be responsible for its "assigned" city. Each group member will be responsible for one of the three facets of this project, namely the weather, the types of activity to be enjoyed during such weather, and the appropriate clothing needed for this type of weather. If, for example, a group is assigned Victoria, BC, then one group member will be responsible for providing Victoria's weather conditions, including temperature, precipitation, cloud cover, winds, etc. Another group member will be responsible for providing a few activities that one might enjoy in accordance with the weather for that particular day. The final group member will then be responsible for providing the types of clothing needed for those activities as well as for the weather of that day. Students will be reminded that the activities and clothing they choose must reflect the actual weather for their city and its weather. Students will then have to make a poster which depicts their part of the project, and which will be used for a short oral presentation in the form of a "mock" weather report. Students will also be reminded that they must stick to the websites provided in order to complete this project as well as retain their computer privileges.
Introduction to On-line Information: At this point, the teacher(s) will give a brief demonstration as to how weather information can be gathered from the aforementioned "weather" sites. This would include demonstrating where to look for certain "key" information, especially that which

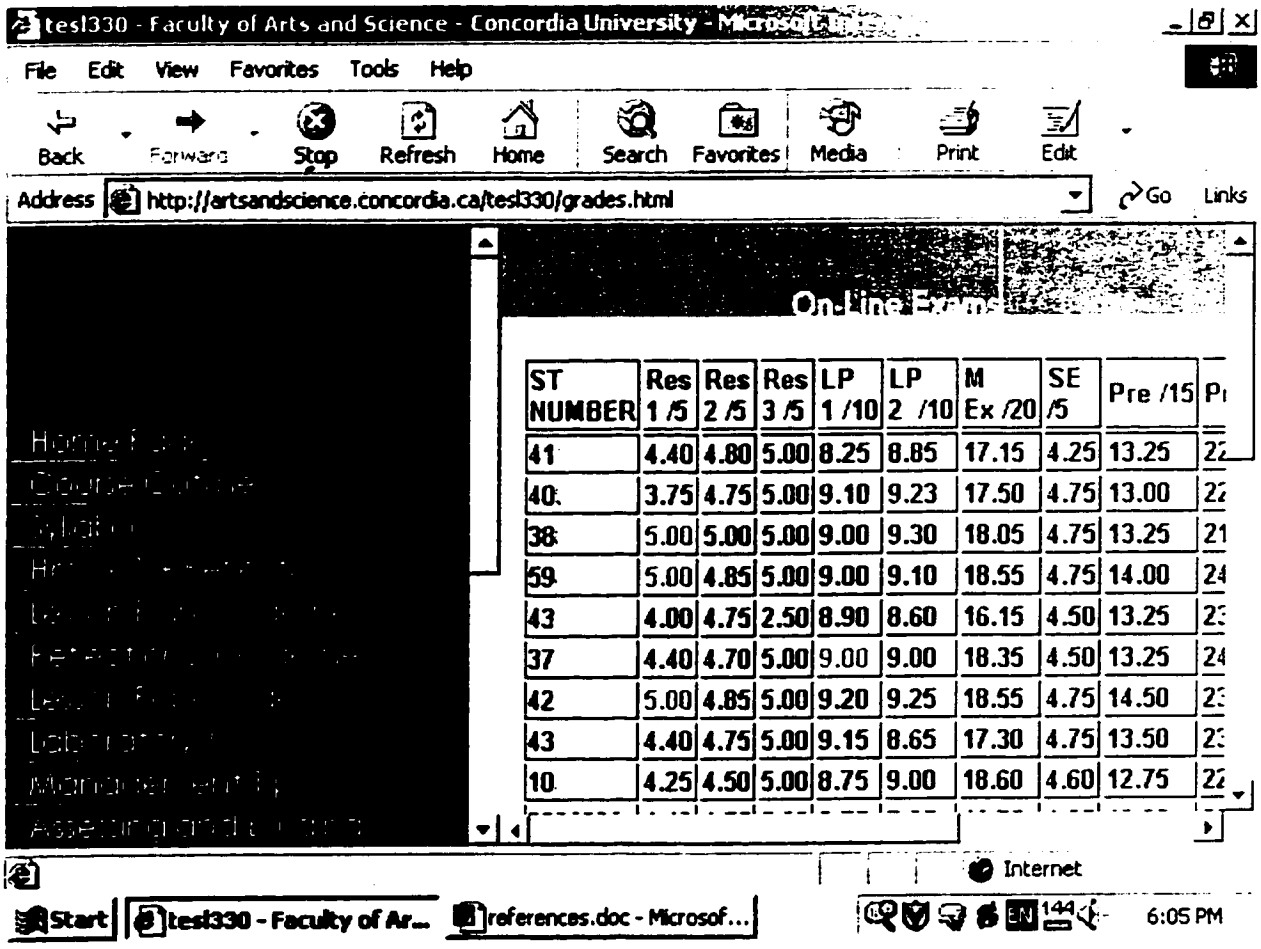
pertains to this project. The students will also be shown how to find and select images from the pre-determined sites for the clothing and activity parts of the project. This would include a brief explanation of how to "right click" images and save them to be printed later. The teacher would then allow the students to familiarize themselves with the necessary sites, and would be on-hand to give help when needed. Groups and cities would be assigned either at the end of class, or at the very beginning of the next period. These introduction parts of the project should completed after one period.

At least two periods will be spent in the lab in order to allow the students to gather sufficient information about their assigned city's weather, as well as to collect and print out images depicting the activities the students have selected and the types of clothing they suggest for those activities, according to the weather.

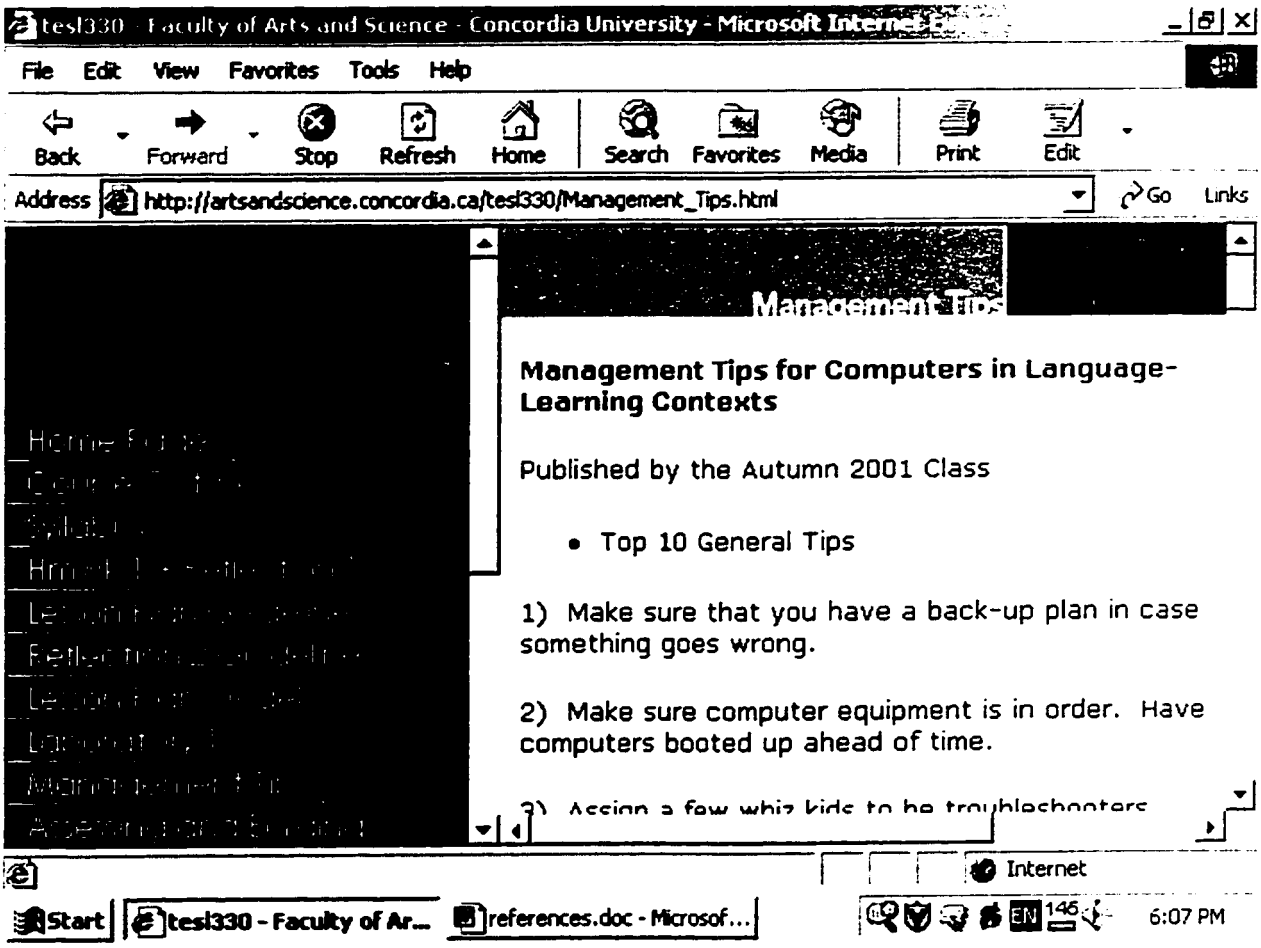
Poster Making: Now that the students have had sufficient time to gather the information and print out the images they require, the class will return to the classroom in order to make their posters for the presentation. This should take at least one whole period.

"Mock" Weather Report: Using their posters as "cues", each group will give a short weather report in which each member of the group will present their part. Obviously the weather report will come first, followed by suggested activities for that day, and finally the types of clothing suggested to fit with both the weather and the activities.

Appendix L: The Student-teachers' Marks



Appendix M: Sample of Student-Published Work



Management Tips for Computers in Language-Learning Contexts

Published by the Autumn 2001 Class

- Top 10 General Tips

1) Make sure that you have a back-up plan in case something goes wrong.
2) Make sure computer equipment is in order. Have computers booted up ahead of time.
3) Assign a few whiz kids to be troubleshooters.
4) Always have extra tasks on hand for the students who finish before others.
5) Form small groups for collaboration tasks.
6) Put a weaker student with a stronger student. To ensure that the stronger student does not take over, ask him/her to write up what s/he did to help the weaker student (for a bonus mark)
7) Make sure that students are not overloaded with material to learn in the class. Give them enough to work on for the amount of time they have in class. If you give them more than they can handle in class, make sure they know this and know that they can finish in a computer lab session during lunch or after school or at home.
8) Give good supporting documentation which is clearly written, well spaced on page.
9) Have a mentoring system : students work in pairs.
10) Teach concepts to whole class using overhead projector.

- Top 5 Tips for Students with Learning Disabilities

1) Establish routines.
This gives the student a feeling of safety, and assurance that can help him or her learn well. The average human mind develops most effectively when it has certain constants which it can rely on, and these constants, when used with prudence in pedagogy can step by step help the student establish his or her own pace.
2) Choose your own ending activities.
Types of activities which favor the development of individual personalities are preferable. Computers have the unique ability of being easily molded to suit many different levels and needs. In these types of activities, the student is encouraged to think independently, and to gain through small steps many encouraging feelings of success which can motivate further success and learning. There are many computer games which can be educational and leave decision-making power within the hands of the students.
3) Be a teacher who is as a facilitator.
A deep and profound learning is only truly attained for life if it is innate. This means that teachers cannot do all the thinking, or even mostof it. The goal of a teacher is to work at motivating and challenging the students to grow, to learn, to expand, and to blossom their personalities. We are a bridge upon which the students walk to their own success.
4) Use keypalling.
Contact with other students with sometimes similar, and at other times different interests, is a key in classrooms that have been traditionally abstract. Keypalling is a means of rendering the classroom, through the internet and email, a more communicative environment. Constructive dialogues, arranged through the curriculum, can provide very rich and real experiences previously unavailable in the regular classroom. Furthermore since none can deny that the

computer revolution is here to stay, the appropriate and academic uses of this media become not only favorable, but necessary.

5) Adapt the computer to the student.

As we all know through our own learning experiences, our knowledge base grows exponentially when we are able to study something which interests us. This knowledge then provides a stable base for further pursuits in other fields, since in the end all learning can be connected. With a little creative thinking, any subject can be made to fit into curriculum needs and goals. This is also the best way to promote life-long learning strategies.

- Top 5 Tips for Children with Behaviour Problems, especially Attention Deficit Hyper Activity Disorder

1) Give students short and very controlled tasks.

This is to ensure that students are on-task.

2) Use software that allows for the teacher to have control.

This will enable the teacher to know what the student is doing, and to be able to give feedback and direction when necessary.

3) Implement an individualized behavioral contract system.

Students will have their own personalized behavioral contract to ensure that their needsare being met. For example, if a system of reward and punishment works for one student it may not work for another, therefore there is a need for personalized contracts. Also, teacher will use the I.E.P. created by the school for each student in need.

4) Ask for extra help from the community, specialists, colleagues, principal, and students.

An extra hand is always needed and appreciated by the teacher.

5) Use project-based learning to motivate students and to make sure that students are working at their own pace.

Motivation and the right to work at one's own pace eliminate many potential managment problems.