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An examination of the relationships of interaction, learner styles, and course content on student satisfaction and outcomes in online learning

A Dissertation submitted by

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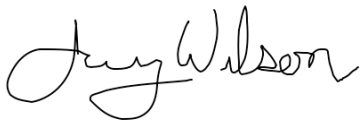

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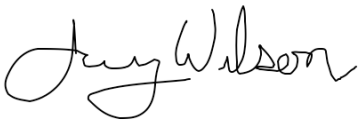
Declaration on Ethics

The research presented and reported in this thesis was conducted within the guidelines for research ethics outlined in the *National Statement on Ethical Conduct in Human Research (*2007). The proposed research methodology received clearance from the University of Southern Queensland's Human Ethics Review Committee (approval number **H06STU556**).



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Abstract

Online education offers many people the opportunity to begin or continue their education. The option to undertake studies has also expanded dramatically due to increasing numbers of online programs. One of the strengths of online learning is the ability to provide a rich learning experience where students have the opportunity to interact using technology. Although a general profile of students who enrol in online courses has been developed, very little of the research is comprehensive enough to create an understanding of the experience of individual online learners. Many studies have been conducted on the process of interaction and there is a need to learn more about how students use interaction and tools in online learning.

A review of current research into online learning uncovered a need for a deeper understanding of how online students engage in interaction, their learning styles, and the types of content they use in their online courses. The research review raised a number of specific questions:

- What types of online interactions are students having?
- Are there particular learner types that are more successful in the online learning environment?
- Is there specific course content that is used more often than others in online learning?
- Are there obstacles to online interactions for students and if so what are they?
- What factors influence student satisfaction in online learning?

In particular do learning styles, course content and interaction influence learner satisfaction and outcomes in online learning? What impact do these variables have, separately and together, on online learners? This study looked at the educational experience of 124 online students using a 125 item online survey and follow-up interview.

The outcomes of this study showed that Participant and Independent learner styles were important factors contributing to the success of online learners. Even if they did not possess the skills before they entered the courses, the ability to demonstrate, analyze, and apply course content was of benefit to learners. Interaction did not have a significant impact on the outcomes or satisfaction of learners. The more closely the online courses matched the individual's personal learning style and approach to online learning the more satisfied and successful they were.

The results of the research include a number of practical examples that can be easily integrated into the online learning environment. Those delivering, teaching, and studying in online programs can use these results to increase their understanding of online education and apply that understanding to making online education more effective.

Chapter One

Background

The motivation behind this research was my own experience as an online student. Most of my coursework has been carried out independently with few opportunities to interact with other students. Initially in my doctoral program, there was an effort made by the instructor to meet semi-regularly using audio-conferencing, but this was only a part of the first course. In the following three courses, the main form of communication was e-mail. Interaction of any kind in these courses was neither pervasive nor promoted.

When I compare my experience with learning in a classroom to my experience learning as an online student, I identify different patterns of activity. In face-to-face courses I am very active and involved, and I interact with other students and my instructor. In an online environment I am often unsure of how to act. I try to be outgoing and initiate discussion in much the same way as in my face-to-face courses but this approach has not been successful for me when interacting with other students. When my efforts to initiate contact are not reciprocated, I feel that I have tried, albeit unsuccessfully, and I abandon further attempts to generate discussion. I am more likely to wait for an invitation from other learners or the instructor before I involve myself in conversation again. This no doubt limits my involvement with other members of the course. I am interested to know if other students are having similar interaction experiences in their online programs of study. My limited success with interaction has not deterred me from online studies nor has it made my learning unsuccessful. I have read about the importance of interaction but I do not feel a need to engage this way to be a more successful learner.

If I examine my own online learning experience in terms of Moore's (1989) three forms of distance education interaction, namely interaction with content, peers, and instructor, I arrive at the following analysis. Much of my own interaction is with content. I have contact with my instructors but this contact is limited to e-mail. I have no interaction with other learners in my program. I do most of my work in isolation. I do not have a support group with which I can share my ideas. I often wonder if online learning is a solitary experience only for me. The following questions come to mind.

- Are students in other online programs studying in isolation?
- What interaction tools or methods do they employ to understand the course and complete requirements?
- Is the online learning process satisfying for others?
- What methodologies and approaches to getting through the learning experience are other students using?

I based the approach to this study partially on my own uncertainties as a student. It is my hope that one of the long-term impacts of the research will be to inform others about the different ways to effectively deliver online programming.

Introduction to the Study

My personal experience combined with a review of research in online education generated a number of interesting questions. What makes online learners satisfied with their courses? Is it simply the opportunity to take a course or is there some aspect that makes them particularly motivated and satisfied? Are high marks the only reason to be satisfied with a course? Can we learn more about the types of course content students are

using online? Do learners prefer to work with their course material and truly digest it and learn it? Or would they rather simply memorize and repeat the information? Is a student with a particular learning style going to be more successful than others? Can someone who is not outgoing be as successful as a student who needs to be actively involved and collaborating with others to make sense of their studies? Answering some of these questions will add to the growing body of knowledge related to online learning.

Around the world, especially in many developed countries, online education has become an accepted method of educating learners. Utilizing the Internet as a delivery format for education has evolved from basic text delivery of material to full-fledged, multimedia-supported learning systems that include problem-based learning and learner generated content (Bernard, Rubalcava & St-Pierre, 2000; Bourne, Harris, & Mayadas 2005; Downes, 2005). Many research examples detail the positive (Sullivan, 2002; Vonderwell & Turner, 2005; Wilson & Stacey, 2004) and negative (Bullen, 1998; Kanuka & Anderson, 1998; Sime & Preistly, 2005) integration of the Internet and learning. The delivery of education using the World Wide Web has made its way into mainstream university and post-secondary educational programming (Tallent-Runnels, Thomas, Lan & Cooper, 2006)

Downes (2005) argues that along with the evolution of the World Wide Web online learning has evolved into a distinct educational paradigm. For him, online learning represents a completely new approach to education that is widespread, is used for growing numbers of both undergraduate and graduate courses, and is important for students unable to access regular courses as well as being a tool to enrich regular classes. He views the application of new technologies to be building on the original intent of the

Internet. His vision goes beyond sharing of content to include interaction between users, creation of content, and a developing a deeper sense of involvement with the learning process.

Online education holds the promise of greater access to education for both traditional and non-traditional types of students. Learners with established careers or families or who are unable to attend on-campus courses for various reasons benefit from the opportunity to advance their academic credentials by using the Internet (Bocchi, Eastman & Swift, 2004). Once limited to a small number of course offerings, students are now able to complete online degrees at the undergraduate and graduate levels. Learners are now able to combine courses from different institutions to create their own programs of study (Western Canada Deans Agreement, 2007). Online students are an important segment of the current university population and will make up more and more of the learners of the future (Ingram et al., 2003; Tucker, Montes, Willis & Blocher, 2001) and although success has been achieved with Internet-delivered programs (for example; see University of Southern Queensland, Athabasca University, and the Open University) there is still much to learn about programs that use the Internet to deliver and support instruction.

Many researchers have identified interaction as the most important aspect of online learning (Garrison, Anderson & Archer, 2000; Harasim, 1990; Moore, 1989;). The literature review in Chapter Two of this study contains many examples of the importance of interaction in distance education and identifies a need to conduct further studies on interaction in online education. This study explored the way students interact online and examined potential methods to make the online learning experience more effective for

them. Details of the learning process were examined to uncover information about what students experience. This information may be used to increase the effectiveness of interaction in the design and delivery of online programs.

We also need to know more about who is enrolled in courses that are delivered on the Internet. Online students have been studied but often only through demographic type questions such as gender or age. These simple questions provide a limited understanding of who the participants are as people but do not always give us an insight into the type of learners they are. Examining learner characteristics in greater depth could tell us how a particular student may or may not succeed in their studies.

Course content is a topic of limited study by researchers. We need to know more about the ways online students are asked to work with their course material. What are the best practices in the opinions of the students? Are the best practices being employing in these courses? There may be teaching strategies and elements of design and support that should be better or more strongly integrated into online courses. There may be elements we need to steer clear of when it comes to packaging content for online delivery and assignments. Finding out what works and what the students find satisfying will inform this process.

While online courses are being developed and offered at a rapid rate, the newness of online education has not allowed us to fully understand how to conduct courses effectively. The gap between research and practice has created a need to conduct more studies and apply the results to online learning development. Bernard, Abrami, Lou and Borokhovski (2004) reviewed 232 full-text quantitative research studies from 1985 to 2002 that focused on online learning. Their study was one of the first truly

comprehensive reviews of distance education research and they reported that the research that they reviewed could be improved. They report that this research is often superficial and without any means of generalizing the findings or the wide-ranging impact. Much of the research is of poor quality from a methodological point of view with issues such as a lack of control, a lack of suitable research procedures, missing research data, and overall poor study design. Research in the field of online education must try to keep pace with the rapid change in both the technology and strategies. These researchers began with 862 potential research studies to review and narrowed it down based on four criteria. That they eliminated 73% of their original pool based on poor quality or missing factors is a telling statistic about this type of research.

Tallent-Runnels, Thomas, Lau and Cooper (2006) compiled a review of 76 research studies that focused on online courses in an attempt to identify both themes and areas of research opportunity. Overall the majority of the studies (N = 40) were quantitative. When the type of study was examined there was a wide range of methodologies. With early studies most of the research was descriptive and exploratory most often using case studies. Later studies were more quantitative in nature using a causal comparative design. They discovered that few universities have policies or technology support related to online course delivery. One issue they found in their study was the need to create common language in the research that was being conducted for classifying research. A major issue was the definitions of online education and online learning. Tallent-Runnels et al. defined online education as the programs offered by institutions whereas online learning focused on what the students were doing during their classes. The most significant outcome of their review was the discovery that no one

comprehensive model for studying online learning exists. Like Bernard et al. (2004) they identified a need to have more consistency and structure in online learning research.

It is generally accepted in education that it is important to employ methods that give an indication of how students are performing or how they feel about their studies. Traditionally grades have been used to determine how well the objectives of courses are being met. The grade point average (GPA) is often used as a measure of student success (Gilliver, Randall & Pok, 1998; Ridley & Husband, 1998). Many studies have compared student grades in online courses versus traditional courses (Cooper, 2001; Harrington, 1999). To have valid research outcomes, it is better to have more than one outcome variable. The grades may show us that the students are successful from a number point of view but it does not give us an indication of how the student experienced getting that grade. Satisfaction with learning is another way of measuring success in online courses. Regardless of what we think works the best, it is the experience and perception of the student that may matter the most in their success with a program of study (Arbaugh, 2001; Eom, Wea & Ashill, 2006; Hayashi, Chen, Ryan & Wu, 2004). In an attempt to learn how students feel about taking their online courses, satisfaction was another important outcome measure in this study.

Pilot study

An online pilot study conducted in 2004 at the University of Saskatchewan by this researcher asked students to rate various aspects of their distance learning courses. The survey was in the form of an online questionnaire the purpose of which was to have students reflect on working with others online and rate the experience. The participants in the pilot study were willing to reflect on what they had done and reported on how they

felt about the experience. The pilot study included questions that asked students if they believed they were part of an online community and asked them to reflect on factors that led to a sense of involvement and inclusion with others. The students reported that the convenience of online learning was important and that working with others can be helpful. Shared understanding of course content and creating knowledge by working with others was valued. Contact with other students was helpful in creating a sense of identity. Within the parameters of their online course(s), students reported actions that fostered a sense of trust with other classmates. Most participants saw value in the friendships they created during their course(s) and hoped that these connections would continue. Although the sample size was small ($N = 14$), the outcomes were encouraging and provided reason to believe that other online students would also be willing to share their insights. Delivery using the Internet helped to increase the number and speed of the responses. The online survey also simplified the management of the qualitative data as it was already in a digital format. It was also easy to conduct follow up interviews with the participants but this option was not used as there were plenty of rich data from the initial survey responses.

Using a similar methodology and building on previous research the initial ideas were modified with the addition of the factors of course content, interaction, and learner styles to determine how they impact online satisfaction and outcomes.

Focus of the study

This research looked at the development and delivery of online education, specifically, “How do learner styles, course content and interaction both individually and collectively impact the satisfaction and outcomes for online students?”

The basis for the research was the results of the pilot study and the identification of a need to conduct more and better-designed research in online learning. This study focused on three key variables of online education:

1) The students' personal learning styles,
2) The way they are using course content and
3) The kind and frequencies of interactions they are experiencing.

The level of satisfaction and the student outcomes were compared to the three variables listed above.

The evidence collected in the literature review supported the belief that the above-mentioned questions could be researched and enough data could be generated to provide answers and useful outcomes.

Chapter Two

Literature Review

The initial review of research focused on publications from 1997 to 2006 and was conducted to create a context for the study. This time period covers the initial development of fully online courses to the development and delivery of complete online programs. The initial literature search included the terms ‘online learning’, ‘online education’, ‘e-learning’, and ‘distance education’. The review used online databases such as ProQuest, ERIC (Ovid), and Silver Platter using EBCSOHost. Using the online tools expanded access to resources and allowed for a comprehensive range of print, online, and microfiche literature to be included in the review.

Online Education

The search results showed a variety of foci in online education research. Most studies on online programs appear after 1999. Topics such as course evaluation (Craig, 2002; Place & Wood, 1999; Valdez, 2003; Viadero, 2003), course design (Chou, 2002; Kendall, 2001; Pearson & Koppi, 2002), community development (Bell, 2005; Joia, 2002; Rovai, 2002), and interaction (Anderson, 2003; Northrup, Lee, & Burgess, 2002; Sutton, 1999) were well represented in the reviewed studies.

A large number of studies were concerned with the role or the performance of the instructor (Bender, 2003, Wolfer & Johnson, 2003). Salmon (2004) outlined the steps that instructors can follow to deliver successful online courses. She identified five stages that allow students to gradually become interactively participating individuals in an online

course. The focus on the instructor may be used to justify the need for training or sharing the experience with those involved or planning to be involved in online course or program delivery (Wang, MacArthur & Crosby, 2000).

Tallent-Runnels, Thomas, Lau and Cooper (2006) compiled a review of 76 research studies that focused on online courses in an attempt to identify both themes and areas of research opportunity. Their research revealed a number of important themes in online education research. They organized their findings into four categories: course environment, learners' outcomes, learners' characteristics, and institutional and administrative factors. They identified a need to do more research in all of the four areas. Many of the research studies included an aspect of online interaction and the different tools used for interaction. Tallent-Runnels et al. discovered little difference in learning outcomes between traditional and online courses. Another recurring theme was that students like to work at their own pace and the better computer training they had the more satisfied they were. Their main recommendations were a need to increase the emphasis on how courses can provide higher levels of interaction and how to generate more effective learning experiences for online students.

Interaction

Of the themes that came from the literature review, interaction was mentioned repeatedly as the one aspect of online course delivery that can have the greatest impact on the success of the learner. Due to its pervasiveness in the initial review of the literature, a further search of the literature was focused on online education and interaction. Social theorists such as Vygotsky (1978) and Bandura (1977) argue that those who participate or interact with others learn better because learners can observe others and

make sense of difficult or complex issues. By internalizing information they generate from interacting with others, learners are able to form their own concepts. In a distance education context, Wagner (1994) defines interaction as “reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another” (p. 8). When people come across the term interaction, a common thought may be one of socializing or involvement with other people. Interactions can be either brief or lasting, they can have little effect on us or they can greatly impact our lives. When students interact, they are able to discuss with one another and share their thoughts and ideas. Harasim (1990) was one of the first researchers to argue that online interaction improves in-depth reflection and topic development. Specifically, she believes that online courses can “increase interaction: quantity and intensity, provide better access to group knowledge and support, create a more democratic environment, have the convenience of access, and foster increased motivation in students” (p. 28). Later her research with others demonstrated the potential of networked technologies to support active collaborative learning and interaction (Harasim, Hiltz, Teles & Turoff, 1997). In their opinion, online education is “uniquely suited to construction, group revision, and sharing of knowledge” (p. 3).

Moore (1989) realized that, for a distance education learner, interaction is very important. Unlike a face-to-face classroom where interaction between students and instructors can occur easily and is expected, online interaction must be promoted and identified as an element students and instructors must work hard to develop (Picciano, 2002). Moore (1989) identified three types of interaction for distance education learners, namely, with the instructor, with other learners, and with the instructional content. The

level of interaction of the learner with each of these influences the success, cost, constraints, and design of the experience. Learner-to-instructor interaction provides motivation, feedback, and dialogue and is similar to the experience of face-to-face environments. The learner receives instruction from the instructor, asking and answering questions, negotiating assignments, and diagnosing misconceptions. Learner-to-learner interaction involves the exchange of ideas and information, collaboration on projects, and sharing of concerns between students in a course. This exchange can occur through structured forms of interaction or through unstructured interaction initiated by students. Learner-to-learner interaction aids in understanding of the material and provides a level of support for the learner (Fulford & Zhang, 1993). Learner-to-content interaction is the process by which the learner acquires information or makes meaning from content. In distance education environments, content can be delivered in a number of ways including print, video, or computer.

Due to the ever-increasing sophistication of delivery mechanisms for distance education, Hillman, Willis and Gunawardena (1994) added a fourth type of interaction, learner-interface interaction, to the three identified by Moore (1989). At the time of Hillman, Willis and Gunawardena's writing, electronic technologies, especially the computer, were beginning to substantially influence distance education course delivery. They saw this electronic delivery layer as another level of interaction for the student. To be able to access content, the instructor, or other students, the learner must also interact with technology. Students may have to develop a new set of learner skills such as how to use a VCR, a CD-ROM, or the Internet. The success of interaction with the elements identified by Moore (1989) depends on how well the students handle this 'fourth'

variable that effectively determines a prerequisite skill set for students. If learners are unable to use technology, they are unable to have any type of interaction.

Moore (1991) also developed the concept of transactional distance. This was a term he used to explain the impact of distance between learners and instructors in a distance education setting. His theory recognized the fact that in addition to geographical distance there is also a distance of understanding and perception. Organizations must work to overcome this gap if effective instruction is to be provided. An attempt must be made by institutions and individuals to provide the technology, and the environment to encourage interaction between learners, instructors and content. He referred to the concept of interaction between instructor and learner as dialogue and the structure is how the course is designed and what technologies are used. These two factors significantly impact the success of the interaction in a course. He also qualified the definitions for the term distance education and distance learning. He believed that distance learning is also part of any distance teaching program and together they form the concept of distance education.

In their review of educational technology, McIssac and Gunawardena (1996) identified five key theoretical constructs that helped to provide a deeper understanding of the learner in distance education: transactional distance, control, sociocultural context, interaction, and social presence.

For McIssac and Gunawardena transactional distance is “determined by the amount of dialogue that occurs between the learner and the instructor, and the amount of structure that exists in the design of the course.” This is similar to Moore’s (1991) understanding of the impact of separation on the relationship between learner and instructor. McIssac and Gunawardena (1996) define control as “the opportunity and ability to influence the

educational transaction", and believe it can develop a more comprehensive view of independence, a core element of distance education. For them interaction is "real two-way communication at the core of the educational experience, regardless of the separation of teacher and student." (McIssac & Gunawardena, 1996, p. 361). They expand upon the concept of interaction and identify it in the sociocultural context as a "significant area for theory building and research", that "affects motivation, attitudes, teaching and learning" (McIssac & Gunawardena, 1996, p. 362). They view social presence as the degree to which a person feels " 'socially present' in a mediated situation or the degree to which a person is perceived as a 'real person' in mediated communication" (McIssac & Gunawardena, 1996, p. 363). These key constructs allow researchers to better understand how learners function in a distance education setting.

Garrison, Anderson and Archer (2000) expanded on Moore's (1989) model with more focus on the elements influencing the learning experience. They represent Moore's three variables in different ways. They use the terms cognitive presence, teaching presence, and social presence online instead of learner-content, learner-instructor, and learner-learner interaction respectively. Cognitive presence is the students' ability to construct meaning through interaction. Teaching presence refers to the many elements instructors use to facilitate active learning. Social presence is the ability of the participants in online environments to project themselves to other online members of an online course (Rourke, Anderson, Garrison & Archer, 2001). These three types of presence intersect and overlap one another to create the educational experience (see Figure 1.)

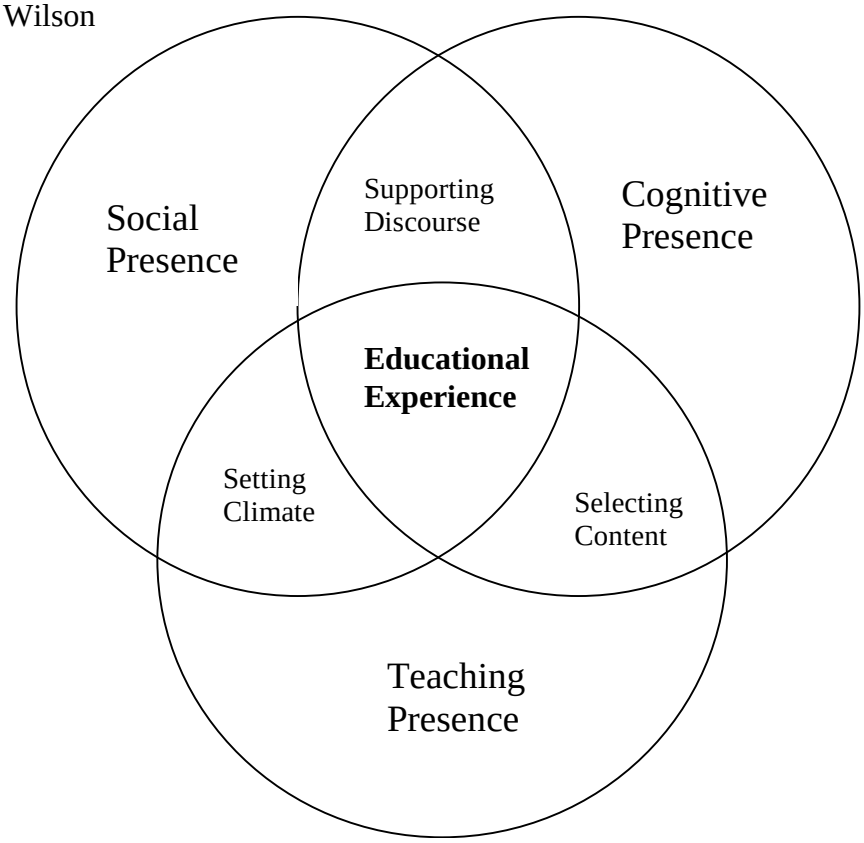

Figure 1: Model of online learning (Garrison, Anderson, & Archer, 2001)

Anderson (2003) focused on interaction in Internet-based distance education. He agreed with Moore (1989) about the original three types of interaction and also recognized the important role of technology as identified by Hillman et al. (1994). Further, he sees interaction as serving many purposes, namely:

- Interaction allows for learner control that facilitates program adaptations based on input;
- Interaction encourages participation and communication that encourages community;
- Interaction aids in the creation of meaningful and personalized learning;
- Interaction is important for pacing; and,

- Interaction invites participants to value another persons' perspective, which is a key component of constructivist learning theories.

(Anderson, 2002)

Using these theoretical approaches to interaction in online learning, researchers have studied student activities when it comes to online interaction. Northrup, Lee, and Burgess (2002) surveyed 52 graduate students enrolled in four separate courses in an online Masters' program in Instructional Technology. Two of the groups were at the beginning of their program and two of the groups were nearing completion. A total of 34 females and 18 males made up the sample. The instrument they used was the Online Learning Interaction Inventory (OLII) (Northrup, 2001) that had been used successfully by other researchers studying online education. Their goal was to find out the kinds of interaction students perceived as important in online courses. The four areas studied were content interaction, conversation and collaboration, interpersonal/cognitive strategies, and need for support. The students rated all of these elements of interaction highly. The participants wanted innovation, and well-designed and supported online courses. They also identified the ability to self-monitor progress as being an important trait for online learners. Their research suggested that in the opinions of those surveyed, interaction is a valuable component of online learning and that interactive elements should be included in future online learning offerings. The researchers were also interested in why students enrolled in online courses. They discovered that flexibility was the main reason for taking online classes. The authors state that their study is a preliminary one and further study of the variables that affect individual online learners is necessary.

Ingram, Conley, McDonald, Parker, and Rivers (2002) interviewed ten Masters and PhD graduate students. This sample was enrolled in a Needs Assessment course as part of an online Instructional Design program at Southeastern University. Students interacted and studied in three groups using an online course management tool. The goal of this research was to find out how groups used technology to interact with one another. Students were asked to reflect on their online group interaction. In this sample, factors such as student personality and experience, trust, and technological skills influenced the successful use of the technology to support interaction. Personality was an issue as conflict arose between some learners while others experienced confusion with the process. These were examples of the ways personality impacted the online experience. Previous experience allowed students to overcome personality issues and have a more positive learning experience. Participants also applied what they learned from being a part of face-to-face groups to work through issues using a variety of strategies. Trust was a problem initially as participants wondered if they could trust other members of the group to participate fully. They were also not sure what they should share with these new colleagues but over time trust was built amongst the learners. The learners in this sample had varying levels of technical skill so it was hard to get all of them immediately utilizing the technology effectively in the course.

Picciano (2002) studied the combination of interaction, presence, and performance and their impact on online students. His sample was 23 full-time teachers who were enrolled in a graduate-level education administration program at Hunter College in New York City. Three quarters of the students were taking their first online course and 16 were females. He asked these students to rate the quantity and quality of

interaction with others. They were also asked to identify how well they believed they were doing in the course. To compare student perceptions to actual outcomes, he grouped students into the categories of high, moderate, and low interactors. This categorization was based on the number of postings made to course bulletin boards. He then compared the interaction levels, levels of presence, and performance levels that the students reported with what they were actually doing. The results showed that the students who believed they were contributing through interaction also believed that they were doing well in the course. This was consistent with what was actually being observed. However, and surprisingly for the researcher, when comparing the actual levels of interactions those who reported low interactions had higher results than those who were classified as moderate. Due to this inconsistency, Picciano believes that we still do not understand the influence of both perceived and actual levels of interaction on performance.

Duncan (2004) looked for factors that made the learning experience meaningful. This qualitative study was based at the University of Manitoba and relied on questionnaires, discussion board transcript analysis, web logs and e-mail interviews for generating information. The research was focused on six online graduate learners and their instructor to find out how they interacted with one another and if they developed a community online. The students represented both rural and northern populations and all coursework was done online. Overall, the group had low levels of interaction and each individual was more committed to their own learning than to collaborating with others. The results showed factors such as self-reflection and self-expression, flexibility, increased technological awareness, and engagement with content relevant to their professional lives as important for meaningful online learning. As all the students were

working full time, these learners did the minimum amount of work to get through the material. The research sample represented those who do not have the time or need to participate in a community or connect more deeply with other students. They did report a need to have student supports in place, to use content that encourages interaction and is relevant to the learners, and to allow students to choose their own levels of peer interaction. The researcher leaves us asking questions such as: What about students who do not have the opportunity to interact with others but desperately want to or need to be successful? What about the learners who may have few resources available or a lack of supports in their environment? For these people, contact and interaction with other students might be very important.

Notwithstanding the identified benefits of interaction, Anderson (2002) cautioned that learners do not always desire interaction with peers and teachers. Much like the outcomes of Duncan's (2004) research, he suggested that some learners use distance education as a way of avoiding interaction with other learners; they prefer isolation. Anderson believed that strength in one of the three elements of interaction might create a successful online learning experience. He stated,

> "Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience."
>
> (Anderson, 2003, p.3)

Frey et al. (2003) examined the strategies that helped students with their online courses. They studied 253 social work students enrolled in a compulsory

advanced research course using the Vark Learning Style Inventory (Fleming, & Bonwell, 2002) to look at the learning styles of the participants. Frey et al. developed the Value Rating Checklist for Web-Assisted Technology to determine which possible web strategies were being used in the online courses. The Computer Attitude Scale (Lloyd & Gressard, 1984) was used to find out how the students felt about working with technology. The researchers attempted to determine which Web-assisted teaching strategies students perceived as valuable. The results illustrate that most faculty use e-mail, post grades online, and give out student e-mail addresses to the class. Students perceive e-mail communication with the instructor and the online provision of course information as the most valuable strategies. Frey et al. discovered that students in their study mostly used e-mail with their instructor in their online courses. The students did not care for many of the interaction strategies that were built into their courses such as student home pages, discussion groups, and e-mail address of other students. The impact of several student characteristics on value perception was also examined, revealing varying levels of influence. The learning styles had no impact on the outcomes for the students nor did the level of computer skills possessed by the students. The last two findings demonstrate the ability of students to be successful and adapt regardless of the type of learner they were or the computer skills they possessed.

Anderson (2003) argued that learner-content interaction could be effective through the use of learning objects. Learning objects are defined as “any entity, digital or non-digital, that may be used for learning, education or training” (LTSC, 2001). Learning objects also: “include multimedia content, instructional content, instructional software,

and software tools that are referenced during technology supported learning" (LTSC, 2000). Learning objects can be shared between institutions to ensure consistency of instruction and to save money (Downes, 2001). Learning objects may be important for developing greater understanding of course material and may also reduce the need for learner-learner or learner-instructor interaction.

Another area of focus on interaction is the research being conducted on the quality and intensity of interaction. Zazelenchuk (1997) reviewed the literature that looked at meaningful interaction in computer-based training. He believed that interaction is an overused term that is not understood by the producers or consumers of educational content. He generated a list of five factors that he believed determine the quality of online interaction. His list includes: active learning, learner control, feedback, multiple media, and learner response options. All of these are important aspects of interaction but he related them only to computer-learner interaction.

Woods and Baker (2004) took the concept of depth of interaction further. Their model makes a distinction between interaction and immediacy. They define immediacy as the behaviours that bring learners closer together in an online environment. Their model was based partially on Mehrabian's (1967) theory that certain communication behaviours create closeness in face-to-face interaction. They argued that both basic interaction and immediacy are part of online learning. Thweatt and McCroskey (1996) stated that immediacy was perceived as "those communications behaviours that reduce perceived distance between people" (p.198). Woods and Baker (2004) used these ideas to create a framework for looking at degrees of interaction, not just the fact that interaction is occurring between the learner, instructor, and content, as is the case with other

theorists. They focused on how the environment can create a stronger, deeper connection between learners (which they call interaction) beyond a simple exchange of ideas (which they call transaction). An intensive sustained contact is needed at a high frequency to have true interaction. They believe that a stronger, more meaningful learning experience comes from this true interaction.

Learner Styles

Another recurring theme in the literature was the analysis of the impact of student personality or learning styles on their online student success. Researchers looked at how the students' understanding of themselves influenced their online interaction, satisfaction and outcomes.

Logan and Thomas (2003) looked at the learning styles of online learners in an online course. Their sample included 46 students enrolled in a computing course at the Open University. They were looking to discover if there were differences in the learning styles of those who enrolled in the course. The researchers used two different methods of evaluating learner styles: the Honey and Mumford Learning Styles Questionnaire (Honey & Mumford, 1995) (based on Kolb's Learner Inventory), and the Grasha–Reichman Learner Style Scale (GRLSS) (Grasha 1996). Participants were asked to complete both surveys prior to beginning work on the course. In their report, Logan and Thomas make a differentiation between cognitive styles and learner styles. They believe that cognitive style is the way a person thinks whereas the learner style is the way they learn. They also point out that both of these styles do not directly relate to intelligence and that one learning style is not necessarily better than the other. They also see that the most convenient and frequently used method of evaluating learning styles is through a

questionnaire but did not say if this was or was not an effective research method. Results from the Honey and Mumford scale show that females were more practical than males. On the Grasha–Reichman Learner Style Scale there was no observed difference between genders in any of the factors that were studied. The GRSLSS showed two different types of students involved in their sample, the Collaborative and Independent learning styles. Their main conclusion is there needs to be a variety in the instructional approaches used in all online courses. This variety will provide the best learning opportunity for all types of online students.

Diaz and Cartnal (1999) compared learning styles of 68 online and 40 classroom-based health education students. They used the Grasha-Reichmann Student Learning Style Scales to study the two groups. They were looking for differences in learning styles between the two groups based on the six identifiers of the scale. The GRSLSS was selected as it was designed to study post-secondary students. It also focuses on the three interactions identified by Moore (1989). Students were given a weighting in the six categories: Independent, Dependent, Competitive, Collaborative, Avoidant, and Participant. Analysis within the online group showed a negative relationship between the Independent learning style and the Collaborative and Dependent learning styles. In other words, people who were more Independent in their learning style also tended to be less Collaborative and Dependent. A second important relationship (positive correlation) was found between the Collaborative learning style and the Dependent and Participant learning styles. That is, students who were more Collaborative in their learning style also were more Dependent and Participatory in their approach to learning. In the equivalent on-campus group, significant positive correlations were found between the Collaborative

learning style and the Competitive and Participant styles. That is, on-campus students who were collaborative also tended to be competitive and participatory in the classroom. Finally, a positive correlation between the Competitive and Participant styles of learning was also observed. Students who tended to compete also were 'good classroom citizens' and were more willing to do what the teacher wanted them to do. The authors concluded that local health education students enrolled in an online class were likely to have different learning styles than equivalent on-campus students. Online students were more independent and on-campus students more dependent in their styles as learners. The on-campus students seemed to match the profile of traditional students who are willing to work in class provided they could obtain rewards for working with others, and for meeting teacher expectations. Highly independent students were seen as more likely to select an environment where they could work alone. The online environment is well suited to this type of learning. Online students appeared to be driven more by intrinsic motives and clearly not by the reward structure of the class. What they did not address were any individual differences within the group of online students. Their focus was also on only one type of course content.

Rovai and Barnum (2003) studied student perception of their online learning. Their goal was to discover the effectiveness of high interaction or passive participation on student performance in online learning. They surveyed 328 graduate students in 19 fully online courses in education and leadership. They discovered that those students who were classified as active, based on the number of postings in a course, also perceived themselves as active learners. The limited number of postings did not impact the performance of those classified as passive students. Differences in student perception

were evident between the courses surveyed but the results were not related to specific course content or learner type. They state that it is hard to generalize any findings about online learning unless a number of variables are controlled. They call for examination of variables such as course content and how individual learners function in online courses.

Lee and Lee (2006) also looked at the combined impact of group composition and personality types on interaction in online course discussions. They used the Meyers Briggs Type Indicator to generate personality profiles of 96 Korean students studying technology using the Blackboard online learning management system. Outcomes were based on number of bulletin board posts and the four categories based on Henri's (1992) model for coding the interaction. Henri's four types of interaction were social, interactive, cognitive, and metacognitive. All the participants had taken two courses. Combined, the students fell into groups of extroverts, introverts, and a mixture of both. The extroverts and mixed groups had more social and cognitive interaction. Extroverts were more likely to participate in the courses by posting more messages. Web-based courses were not as appropriate for introverts but they could still be successful. An effective strategy to use with online groups may be a mix of all learner types as both the introverts and extroverts need each other to be successful.

Young, Klemz and Murphy (2003) used the Kolb Learning Style Inventory (Kolb, 1984) in their research. Their study of 207 participants used learning styles as one of the variables in measuring outcomes in online learners. Young et al. wanted to determine the impact of learner styles on preferred instructional technology, preferred instructional methods, and student behaviours. They examined three outcomes as a measure of success: learner performance, course grades, and pedagogical affect. Learner style did not

have any impact on these three aspects of the group they studied. They speculated that the reason for no difference between the different learning styles was that the course was designed to accommodate different learning styles and was effective. Young et al. pointed out a need to design courses to meet everyone's needs. To them it made sense to have more than one way to measure success in online learning. Their research provided part of the rationale to have more than one outcome in this study.

Chen and Caropreso (2004) studied interactions among 70 undergraduate education students enrolled in an Educational Psychology course that used the WebCT online learning management system. They used the International Personality Item Pool to have students rate their own personalities. The personality ratings were then compared with the coded discussion board postings generated by students. The researchers used the concept of interaction in a different way. They believe that online learners have both one-way and two-way message interactions. Their 'two definition' approach to interaction is different from Wagner's (1994) view of the act of interaction. They state that one-way communication is the act of expressing ideas, or making comments but not inviting reaction or discussion. Two-way is a more involved form of communication that attempts to engage other members of the learning group. Chen and Caropreso concluded that personality type does impact group interaction. When it comes to online communication and task engagement, the more socially outgoing and engaging an individual's personality, the more likely they were to be connected with others online. The more opportunity for collaborative learning, the more able learners were to meet the goals of the course. Examples of this were the ability to engage in longer conversations and to share more ideas. This means that more interaction should make for a better learning

experience and that learners should be aided in their efforts to interact with others in their courses. Those with outgoing personalities will be more successful and those who are not as outgoing need to be encouraged and supported. Regardless of their personality type, students need to be given many different opportunities to interact. The results of this research lend support to the belief that learners will decide what they will do even if they are provided with a variety of interaction opportunities.

Course Content

Another outcome of the literature review was the near absence of research into the impact of course content in online learning. The literature review showed that course content as a factor that influences online learning has not been the focus of much research. The limited amount of research that was found on this topic centered on how content is used by students rather than the impact that specific types of content may have on the learning experience.

Many of the studies involving course content used the analysis of discussion transcripts to generate data. These studies demonstrated that coding and analyzing are difficult but can provide useful material. Christopher, Thomas, and Tallent-Runnels (2004) analyzed student-to-student interaction on electronic bulletin boards as a measure of interaction with content. They studied a course that met a few times face-to-face and then relied on weekly discussion board postings to work through the course content. Their sample consisted of ten graduate students working towards a Masters Degree in Gifted Education at a small private university in Texas. The program used the Blackboard learning management system to facilitate the courses. Their main goal was to analyze the level of thinking used in an online discussion forum. They also tried to determine if the

level of discussion starter or ‘prompts’ had any impact on the level of responses or use of the knowledge. They based their analysis of bulletin board interaction on Bloom’s taxonomy and called their instrument the Taxonomy for Evaluation of Online Discussion. They defined responses as low, medium, or high by grouping together Bloom’s six levels into three. They were able to apply their scale to breakdown the course content created by the students. Christopher et al. found that higher level prompts from instructors had little impact on the type of responses generated by students. They observed no relationship between learner type and posting length and that regardless of personality type, students were positive and receptive. They found that students worked with content at medium levels (analyzing and application of content) and that the responses were at a low or medium level as well. They were unable to answer two of the three research questions due to the low level of frequency of postings on the discussion boards by the participants.

Miller and Wallace (2002) studied the frequency of use of discussion boards and number of student visits to all WebCT online courses at the University of Manitoba over a two-year period. Their sample included more than 3000 students in each year. These students were registered as independent or distance education students. The use of the online discussion tool and other content in WebCT was optional for the students. They also conducted a detailed qualitative review of discussion board postings of the same participants. Miller and Wallace determined that the more discussion content available the more visits the site received from students. They also found that increased visits to a course page and high levels of discussion board interaction are helpful in keeping students engaged in their studies and help to reduce the feeling of isolation.

Murphy and Coleman (2004) studied 20 online students enrolled in a Masters of Information Technology program to generate insight into their use of discussion boards in online learning. The program used the WebCT online learning management system. Murphy and Coleman uncovered five major challenges related to communications and interaction using discussion boards. These challenges were: technical issues with the application of discussion boards, learning to learn online, involvement/role of instructor, need of support, and lack of social interaction. Murphy and Coleman chose application of discussion boards as a challenge upon which to focus and continued to look at this issue more deeply. They were able to find out what students thought by using online discussions with the participants. Their study incorporated discussions, questionnaires, and online interviews. They followed the analysis of the discussion board results with a questionnaire and individual interviews using an online chat program. The outcomes showed that students need the skills necessary to function in an online environment. This puts the onus on instructors and designers to properly introduce this new way of learning. Also they will have to learn to deal with a shift of control from teacher to the learners. Students need to be more assertive in an online environment because the lack of verbal and nonverbal cues and the asynchronous nature of online learning can make courses sterile and impersonal. It is also more difficult to interpret what others really mean. Murphy and Coleman's research suggests that instructors need to ensure that their online learners' skills are well developed and that they have a proper orientation and support throughout the course.

The use of transcripts has shown that coding and analyzing are difficult and that researchers need to employ a variety of methods for data analysis. Although there is a

limited range of data generated using transcript analysis, this methodology can provide useful outcomes. The success of discussion board transcript analysis was taken into account during the design of the course content section of this study. The results of these studies show that this is one way to track the frequency of interaction but not necessarily the quality or use of content.

Summary of Literature Review

After the focused review of the literature, a number of possible areas of study emerged. Researchers have shown some but not an extensive interest in the areas of learner styles and the impact of specific course content on online learning. Studying the learner styles of online students to determine if there is a connection between style and interaction has not been a major focus of researchers. There is also limited published research on the relationship of learner interaction and type of course content. To date there has been little research that examines the course content as the main variable in a study of online learning. Is there material that is better suited to particular types of interaction than others? Is there a particular frequency of interaction, based on the organization of Bloom's taxonomy, that determines whether certain learning materials are more effective than others? The studies reviewed made mention of the general nature of the courses but do not examine the type of content and the impact that it has on the interaction experience. Collecting and analyzing data about the relationships between content, learning styles, and interaction will uncover a variety of useful outcomes.

Research Questions

- Even with the identification of many examples of interaction, and an increasing emphasis on interaction in online education, it is not yet clear what the balance among different forms of interaction that best facilitates learning should be. In addition the variables of learner style, course content, and interaction maybe keys to online student success and need to be the focus of more study. Specifically, how do learning styles, specific course content, and interaction come together to impact satisfaction and outcomes for online students?

Chapter Three

Methodology

The literature review in Chapter Two supports the need to know more about the variables of interaction, learner styles, and content on online learners.

The main research focus was to measure these three variables and to determine their impact on satisfaction and outcomes for online learners. The major research question to be answered was:

> How do learning styles, course content, and interaction come together to impact satisfaction and outcomes for online students?

To help in answering this question, four sub questions also needed to be answered. Generating answers for each of these allowed for the creation of a statement regarding the main research question. The four research sub-questions were:

> Research Question One: What is the relationship between learning styles and amount of interaction experienced by students?
>
> Research Question Two: What is the relationship between course content and specific types of online interaction?
>
> Research Question Three: What is the relationship between online interaction and student satisfaction?
>
> Research Question Four: What is the relationship between learning styles, course content, interaction, and student outcomes?

To answer the research questions, data was collected about student learning styles, course content, and experience with interaction. The answers to these questions were analyzed and compared to generate an understanding of how each of these factors may influence student outcomes and satisfaction.

The first phase of data collection was an online survey used to obtain data about the key variables. A survey facilitates the examination of the gaps in previous research through the use of an online questionnaire. To answer Question One, there was a need to know participant learning styles and understand how these learning styles related to interaction. To answer Question Two, there was a need to know about the course content students were working with and how it related to interaction. To answer Question Three, there was a need to know about levels of student satisfaction, the marks received, and how these variables related to interaction. Question Four was an analysis of the impact of a combination of course content, learner style, and interaction on student outcomes. The results from these four sub questions will contribute to answering the main research question. The online survey instrument consisted of six sections delivered in the following order: Course Content, Learning Styles, Interaction, Course Outcomes and Satisfaction, Background Information and an invitation to a follow-up interview (See Appendices F – J). Each series of questions gave insight into the section focus.

In the course content section, participants were asked to identify the frequency of use of specific types of course content they had worked with online. Using Bloom's (1956) Taxonomy, a series of questions was developed to allow classification of course content used by the research participants. Bloom's system for grouping course content has been a standard model used for many years in all areas of research in education. Bloom's Taxonomy classifies the depth or intensity of thinking needed to perform a task. This instrument was designed to measure the usage pattern with course content. To create this scale, the Taxonomy was broken into the six categories. Each of the categories was represented by a single question asking the participant how often they used course

content in a particular manner. These questions were generated from the set of the descriptors used by Bloom. The questions incorporated specific terms that were action words that were easily recognized and applicable to specific course content. These words were put into the form of a question asking the student if they had been required to use course content in a particular way. The amount of use with these terms defined the type of course content the student encountered in their studies. Other similar descriptors were incorporated into the help feature of the each question in this section. Using this widely accepted scale allowed the type of content to be determined based on the level of thinking required by the participants.

Participants also identified their program type based on general choices among disciplines such as health sciences, education, engineering, etc. This section allowed participants to be grouped based on their use of content. It provided insight into the course content used by instructors.

The second section of the survey examined learner styles. The Grasha-Reichmann Student Learning Style Scales tool (Hruska-Reichmann & Grasha, 1982) was used to identify the learning styles of the participants (see Appendix B). Grouping the student learning styles allowed them to be categorized and then compared. Grasha and Reichmann's Student Learning Style Scales focuses more on students' preferences for the learning environment. The learner style was a measure of how the students conducted themselves as online learners in relation to a particular trait. The scale used questions to generate a score on a particular learning trait. Unlike other personality scales this instrument asked specifically about online learning. This scale has been used in research into online education and has proven to be an effective tool for gathering research data.

Logan and Thomas (2003) successfully used the GRSLSS in their own research and they gave a description of each of the six categories. They outline the six different styles: Independent, Avoidant, Collaborative, Dependent, Competitive and Participant.

Table 2. Grasha & Reichmann's Student Learning Styles (Grasha 1996 in Logan and Thomas 2003)

Style	**Description of Style**
Independent	Students like to think for themselves and are confident in their learning abilities. Prefer to learn the content that they feel is important and would prefer to work alone on course projects than with other students.
Avoidant	Not enthusiastic about learning content and attending class. Do not participate with students and teachers in classroom. They are uninterested and overwhelmed by what goes on in class.
Collaborative	Typical of students who feel they can learn by sharing ideas and talents. They co-operate with the teacher and like to work with others.
Dependent	Little intellectual curiosity and learn only what is required. View teacher and peers as sources of structure and support and look to authority figures for specific guidelines on what to do.
Competitive	Students learn material in order to perform better than the others in the class. Believe they must compete with other students in a course for the rewards that are offered. Like to be the centre of attention and to receive recognition for their accomplishments in class
Participant	Good citizens in class. Enjoy going to class and take part in as much of the course activities as possible. Typically eager to do as much of the required and optional course requirements as they can

The questions in the scale were modified and tested to ensure that they were appropriate for use with online students. This included removing references to face-to-face interaction and substituting the term 'online' for the term 'classroom'. These descriptors were used to identify learner characteristics of online students. The data from this instrument allowed the participants to be grouped into different learner styles categories. Rather than a scale that determines only personality such as the Kolb Learning Inventory or the Meyers Briggs Indicator test, the GRSLSS was utilized to give an insight into how students function as online learners by generating a more accurate analysis of the types of learner in the study.

The interaction section of the survey asked participants to respond to questions about the various types of interaction of which they may have been a part. The interaction section was based on Moore's (1989) theory of three types of interaction in distance education. The three ways of interaction identified by Moore make up the questions in the three interaction sections. Interaction frequencies showed how the student worked with their instructor, with content and with others involved in their courses. They were also asked if they had any difficulties interacting using technology. This second part of the set of questions was based on the work by Hillman et al. (1994) and their fourth form of distance education interaction. This set allowed participants to report on how they interacted using technology.

Combined, the responses to this set of questions illustrated the frequency of interaction students were having. The section was also designed to go beyond the fact that interaction was happening to look at the intensity of the interaction as well. Participants were then grouped based on their level of interaction in a number of different learning situations. Moore's theory has been used in many other studies and is viewed as an important cornerstone of research into distance education. This research is the foundation for the interaction section of the research.

The course outcomes and satisfaction section had the research participants indicate their grade results and rate their satisfaction with their online experience. Many studies have used grades to measure success so this was accepted as an appropriate way to gauge success. To measure satisfaction, a new four–item instrument was constructed to determine how the students felt about their courses. Participants were asked if they enjoyed the experience, if their needs were met by the online learning experience, if they

found online learning to be beneficial, and if they would pursue more online education in the future.

The demographics section asked the participants about their age, gender, geographical location, language, how many online courses they had taken, and their computer experience. These responses were used for comparing various groups of participants.

The final section asked the students if they were interested in participating in a follow-up telephone interview to review the results of the survey. These results allowed for the creation of a pool of potential interview participants.

Follow-up interview

To fully conduct the investigation of the research questions the online survey was followed by interviews. Johnson and Onwuegbuzie (2004) promoted the use of this type of comprehensive approach to conducting research. They argued that the use of mixed methodology aids the triangulation of results, allows for the blending of complementary approaches, helps to identify contradictions and paradoxes, and allows for development and expansion of the research. A follow-up interview with a small sample of participants was incorporated to validate the survey results and to expand on what the participants reported. Noonan (2002) studied the use of such an approach as a follow up measure of interpreting data. This method is referred to as “interpretation panels” (p. 90). In Noonan’s study, researchers completed their data analysis and presented the findings to a focus group for comment. This method is intended to have participants comment on the outcomes of the research and help to draw conclusions. In this study individuals acted as the commentators. Follow-up interviews permit a deeper analysis of the outcomes of the

survey and have the potential to generate new insights into the relationship between interaction, learning style, and course content.

The interview phase of data collection used a small number of in-depth interviews to expand upon the results of the survey. A single interview with each participant was conducted lasting approximately sixty minutes. The interviews were conducted three ways either face-to-face, using Skype, or by telephone. The sixty-minute time limit allowed all participants equal time to share their thoughts. After each interview the researcher summarized the tone and general impressions of the interaction with the participant. Each interview was recorded and transcribed, and then the transcripts were reviewed and approved by the participant through electronic mail. The interview data were then analyzed for comments and themes relevant to the research questions.

The initial part of the interview was used to create a bond or connection between the researcher and the participants. General questions about interaction, a review of the online survey questions, and students' reflection about their online experience were part of this initial contact. The second part of the interview session was designed to examine the outcomes of the online survey. The results of the survey were shared with the participants and they were asked to comment on the results. The third phase was used to discuss responses to the previous questions and comment on themes raised by other interview participants. The second part of the third phase was not possible for the first person to be interviewed. Instead, a short second interview was conducted with this individual and input from the other interviewees was shared. Every attempt was made to ensure that the conditions of each interview were consistent from one to the next.

Once all of the interview data were transcribed and approved by participants, the information was organized into themes using a coding system (Miles & Huberman, 1984). Initially the transcripts were broken down into common themes. Lincoln & Guba (1985) refer to common qualitative themes as “units”. These units can range in size from one or two sentences to many paragraphs. In the next stage the units were grouped into common categories based on similarities of content. The transcripts were reviewed several times to ensure consistency with the coding process. In addition, coding was validated by having other researchers code a sample of the data and compare their results to those of the researcher. Once the categorizing was complete, the thoughts and reflections of the individuals were related to the research questions. The final report addressed the research questions using the survey results presented as a series of themes interspersed with interview data. Although previous survey results suggested that online studies generate useful data, posing follow-up questions and having the students explain their responses in their own words in their own way gave more insight into the answers to the research questions. The interviews allowed the participants to validate the findings from the survey and allowed them to add their own insights.

Ethical procedures

Ethics applications were made to both the universities whose students were involved in the project. Both requests were approved shortly after minimal changes to the wording of the documents were submitted.

All participants participated with the knowledge that their results would remain confidential. All participants were given the right to withdraw from the research at any

time. For those taking the online survey, the single biggest inconvenience was the time spent answering the questions.

The online survey used a secure Internet server to house the online survey responses. The responses were password protected so that only the researcher had access to the data. While completing the online questionnaire, participants were invited to participate in a follow-up interview. Those who indicated an interest in taking part in the interview were asked to provide an e-mail address so they could be contacted once the survey data had been analyzed. Those selected to participate in an interview were sent an informed consent form. Once the consent form was returned the interviews were scheduled. (A sample of the informed consent release can be found in Appendix E and Appendix F). All information gathered is kept in a secure location at the University of Saskatchewan used to safeguard research material. Interview participants were also required to complete a signed release for the qualitative data. Participants were given the opportunity to review and sign off on the data after the interviews with the knowledge that any direct quotes to be used in future publications would be anonymous. To allow for maximum transparency of the process, participants were made aware of the ethical concerns related to the research before they agreed to participate in the interviews. They were not asked to comment on specific details of their course related to content or to evaluate the teaching abilities of their instructor. In addition, any references to specific place names or events were changed to protect those who were providing the data.

Study Design Limitations

It was important to get responses from students soon after they had completed their courses to get an accurate representation of their experience. This addressed the

concern that once students have completed a program or course the difficult issues do not seem as bad and the positive issues may be recalled as being even better. There were some participants who had taken courses over a long period of time and had problems remembering specific events related to those courses they had taken in the distant past.

The lack of face-to-face in contact with participants made connecting with individuals more difficult. Distance from participants and coordinating time zones also made the scheduling of interviews more difficult.

Fontana and Frey (2002) break down the various types of interviews into structured, group and unstructured. They raise the concern that “we live in an interview society” (p. 646). Due to this, participants must be made aware of what the research is about and how it is different from the many other interviews in which they may have participated.

Trustworthiness of interview data is a concern for anyone conducting research. The three areas of trustworthiness in research are:

- Ensuring the accuracy of the responses from the participants,
- Personal bias of the researcher, and
- The reaction of the participants to the researcher. (Locke, Spriduso & Silverman, 2002, p.103)

Combining a survey and an interview allowed for themes and consistencies in the stories of the participants to be compared. There was a need to be wary that what actually happened may have been corrupted by the interpretation of the learner and then by the researcher. All that was hoped for was the honest reflections of the participants to help minimize bias.

Validity

Validity of the research survey was addressed in a number of ways. Existing scales and surveys were employed where possible to ensure consistency with previous research. The independent variables examined were: learner styles, which was examined using the Grasha-Reichmann Student Learning Style Scales; course content, based on Bloom's Taxonomy (1956); and interaction, based on a combination of Moore's (1989) Theory of Distance Education Interaction and Hillman et al.'s (1994) Learner-Interface Interaction Model.

To guide the choice of constructs and to give feedback on the development of the survey instrument a group of research experts was assembled. This group consisted of three professors with a background in research statistics, two graduate students, and one instructional designer. The expertise of this group covered the areas of online education, research statistics, research design, and online survey construction. All of the faculty on the expert panel had taught at least three online courses and had knowledge of both the development and delivery aspects of online course delivery.

In this study certain factors that were studied were easily measurable based on reported behaviours. This included grades, amount of interaction, and course content. It was easy for students to report a grade, how much time they spent interacting, or the category of their course content. Other constructs were not as easy to measure. These two constructs were the learner styles, and satisfaction. For both of these constructs, an existing scale had to be modified and another scale had to be created.

Construct validity was examined before the research began to ensure the correct focus for the research was chosen. The literature review uncovered issues that were

viewed as important by other researchers and needed further study. The literature review was clear about the importance of interaction, course content, and learner styles as areas in need of further study. Interaction has long been an important issue in the study of distance education and now online learning and learning in general. There was agreement amongst members of the expert panel that the constructs were worthy of study and it was possible to measure them.

In any research it is important to ask the right questions. This creates a need for a strong instrument. Ensuring content validity was an on-going process with the expert panel and usability study contributing to the development of the survey instrument. Once the first draft of the instrument was completed it was circulated to the expert group. Each member of the group responded with a variety of comments and suggestions that were incorporated into the pilot version of the instrument. Validity, survey layout, scale rating choices, and wording of questions were addressed and appropriate changes were made.

A usability test was conducted with five participants who represented the sample population. The test was conducted with one undergraduate and four graduate students. Three were male and two were female. Four out of the five had completed two or more online courses. One of the participants did not have English as a first language. It was important to include a non-native English speaker, as a portion of the participants from the Australian university might not have English as their first language because of the global reach of its programs.

Each participant was tested in the same location and under similar conditions. They were informed of the purpose of the testing session and asked to comment on the

content as well as the design and delivery elements of the survey. The researcher was present to take notes and respond to or ask any questions.

Minor changes were made after each participant had taken the survey. After all of the usability tests were completed and the outcomes analyzed, more significant changes were made. These changes included numbering questions to make the progression through the longer learner styles section clearer, making word order changes to questions to make them easier to understand, and making the help sections more obvious. Numbers were added to the questions in all sections to prevent participants from getting off track or missing questions. The only instance of confusing jargon was the word “cram” which was taken out of Question 40 to clarify it for non-English speakers. In the course content section each question had a help statement added to provide additional clarity for the participant. After the survey data had been collected, the internal consistency of the scales in the survey instrument was examined by computing Cronbach’s Alpha.

Also part of the development of the instrument and prior to the transfer of data to SPSS statistical analysis software program, an empty file with a set of variables was created as a shell to allow the raw data to be imported. This ‘shell’ file mirrored the organization of the questions in the survey. The SPSS variables file was successfully tested with the results of the usability study before making the actual survey available to participants. During this testing phase a number of modifications were made to the survey to allow both the organization of the data to be clearer and to ensure accuracy with the responses.

Once the usability test was complete and changes were made, the survey was again circulated to the expert group for final analysis. This group was in agreement that no other changes were necessary.

Sample

With the usability testing of the instrument completed, the process of recruiting participants was initiated. Online students were the sole source of participant data. The population consisted of university students from Colleges of Education at the University of Southern Queensland, Australia and the University of Saskatchewan, Canada. The choice of these two institutions was based on the successful application of online education at both institutions and ease of access to potential participants.

The criteria for participant inclusion in the research were enrollment in or completion of one or more Internet-delivered post-secondary courses. Participants also needed to be able to read and respond in English.

A request was made to the Dean of Education at University of Southern Queensland and to the Curriculum Studies Department Head, College of Education, University of Saskatchewan to allow members of the faculty to be asked to participate in the research. Once this permission was secured, a request was sent to the 15 faculty members who had taught online courses in Terms One and Two in the 2005 – 2006 school year. If needed, the Semester Three courses at the USQ could also be included. The faculty members were provided with an overview of the research and were asked to indicate in writing if they were interested in participating and to provide a list of the courses and terms that they had taught in the target year. A total of eight USQ and five U of S faculty members agreed to participate. Only two faculty members did not respond.

These two were asked a second time but no response was received. The two non-participating faculty members taught two courses totaling 38 students. Of the remaining 13 participating faculty members six faculty members asked to see the survey questions in advance or asked for further clarification on the goals of the research. All who made these requests were satisfied with the responses to their requests and agreed to participate. In all 19 (13 USQ, 6 U of S) separate courses made up the sample population. A total of 477 students were sent the invitation to participate in the research. (The sample broke down into 412 students from USQ and 65 students from the U of S.) Once the courses of the faculty who agreed to participate were determined, a message was sent directly to the students' e-mail addresses. The e-mail request was sent out using the Re-mailer program at USQ and the PAWS system at the U of S. Both of these systems allowed for targeted yet confidential delivery of e-mails to current and former students. The request was sent to the USQ students first and to the U of S students one week later. The invitation (Appendices C & D) informed those selected about the survey, why they were chosen, and their rights to participate or refuse to participate in the research. The e-mail request included a link to the online survey for the individual to follow if they chose to participate.

In the first two days after the invitation was sent 49 responses were received. Responses continued at a rate of 2 – 11 a day for the next two weeks. After the intensity of the surveys had lessened, a follow-up e-mail was sent out. This message thanked those who had participated and reminded those who had not yet submitted a survey to do so if they wished. This second e-mail produced a further 28 responses. A total of 124 completed surveys were submitted during the time that the survey was active.

After consultation with the Expert panel and faculty advisor, the 124 surveys were deemed sufficient to generate valid outcomes. The decision was made to proceed to the data analysis stage.

Chapter Four - Data Analysis

The data analysis consisted of four phases: 1) a survey response analysis that analyzed the internal consistency for each of the scales: 2) a content analysis as the basic descriptive phase of the research and a comparison of results from the different scales linked to the research questions using cross-tabs and Pearson's Correlation Index: 3) an analysis of data that was more detailed employing an inter-item correlation analysis using Pearson's Correlation Index, t-tests to compare group means, and an analysis of variance (ANOVA) to answer the research questions: and 4) a follow-up transcript analysis. The transcripts of these interviews were analyzed, coded, and then compared to the survey outcomes. The purpose of the post-hoc interviews was to expand upon or add to the responses or outcomes of the survey results.

Data screening

A frequency analysis of responses to the survey was conducted to screen for any abnormal data sets or outliers. The number of missing results was small. Questions with missing data were examined to determine the impact on the data sets.

The criterion used for list wise elimination of data was that any non-optional question for which the number of missing responses was greater than 10% would not be used (Roth & Switzer III, 1999). Using 10% as a guide, significant numbers of missing responses were discovered in only four questions. Those questions that had significant numbers of missing values and were eliminated from analysis were all a part of the Grasha-Reichman Learner Style Scales. The only other questions that had missing data

were optional questions for which the missing information was not interpreted as significant. All results from these optional questions were included in the analysis.

The entire set of responses was exported as a comma separated value file (.csv) and imported into Microsoft Excel for review. These results were then copied from MS Excel and pasted into the SPSS statistical analysis software program for more detailed analysis.

Scale reliability

The internal reliability of the scales was examined by computing Cronbach's Alpha for each scale. Briggs and Cheek (1986) report that an Alpha score of .7 is acceptable to confirm the reliability of a particular scale. Any higher and the scale begins to become redundant. A slightly lower score can give a broader range from which to draw the results. Based on this research all scales reported acceptable levels of reliability that supported the use of the results from the survey to answer the research questions. The Alpha score for the interaction scale was especially high.

Table 1: Reliability of Survey Scales

Scale	Number of items	Cronbach's Alpha
Course Content	6	.660
Learner Styles	56	.757
Learner Styles (Collapsed)	6	.580
Interaction	24	.933
Satisfaction	3	.653

Alpha reliability was also calculated for the four smaller subscales in the interaction and learner styles sections. It was important to ensure that these measures were reliable as the subscales would be used to answer the main research questions. The individual subscales were used in a number of different comparisons. These scales had acceptable reliability scores.

Table 2: Reliability of Interaction and Learner Style Subscales

Sub-Scale	Number of items	Cronbach's Alpha
Interaction with instructor	5	.645
Interaction with other learners	5	.564
Interaction with content	4	.536
Learners style scale	6	.580

Table 3: Interaction with Subscale Items

Instructor	Mean If deleted	Alpha if deleted
E-mail	11.51	.624
Discussion Board	11.32	.544
Chat	12.37	.510
Videoconference	13.11	.622
VOIP	12.58	.582
Other Learners		
E-mail	11.65	.500
Discussion Boards	10.82	.547
Chat	12.07	.349
Videoconference	13.00	.584
VOIP	12.51	.492
Content		
Web	10.43	.603
E-mail	11.63	.361
Discussion Boards	10.72	.391
Chat	12.14	.453

Statistical analysis

Recoding of selected data was utilized in some sections to facilitate comparisons of scales using categories of results. This involved the calculation of means and allowed for the recoding of selected responses into frequencies of high and low, and high, moderate, and low to allow for grouping of participants into various categories. These

recoded results were then used to conduct *t*-tests and analysis of variance to address aspects of the research questions.

Three different scoring systems were created based on the items being recoded. For the interaction questions the scale was based on a four-point scale used for answering the questions. On this scale a score of 2 – 3.29 was considered low, a score of 3.30 – 3.59 was considered moderate, and a score of 3.60 – 5.0 was considered high. The scoring system on this scale had a narrow middle range due to fewer items on the scale and a more defined set of choices for the participant.

For the learner style, course content, and satisfaction sections where necessary a scale was created based on a five-point response scale to allow for categorizing of the responses. The participant could choose a rating of strongly disagree, disagree, not applicable, agree, strongly agree, or never, rarely, neutral, often, or frequently. Where necessary these responses could then be recoded for further analysis. A score of 1 – 2.59 was considered low, a score of 2.60 – 3.49 was considered moderate, and a score of 3.50 – 5 was considered high. The range on the second scale was generated based on the scale having a narrowly defined median mark for moderate and two more closely-related choices in each of the high and low categories. For sections that did not create a significant division in the recoded data using the high, moderate, and low scale, a high/low scale was used. This scale was constructed with a low score falling in the range of 1 – 3.59 and a high score falling in the range of 3.60 – 5.0. Means for each category were calculated to allow for further comparison.

The next stage of the analysis involved looking specifically at how the data supported the research questions.

Background information

This section analyzed the background of the participants and consisted of nine questions. The independent variables studied included gender, on-line course history, and age. The information from this section contributed to the understanding of how competent the participants were based on their computer skill level. Participants were also asked about their country of residence and their linguistic background. The complete set of questions is found in Appendix J**.**

Table 4: Background Information Questions

	N	Mean	SD
Number of online courses taken	123	2.18	.702
Available only online	118	1.42	.496
First language	120	1.10	.302
Taught in first language	120	1.10	.301
Computer skills	124	4.23	.795

The gender breakdown was female *N* = 85 (68.5%) and male *N* =39 (31.5%). This result was consistent with the make-up of many online programs that have a majority of females in their enrollment.

Participants were asked to identify how many online courses they had taken. A significant percentage of the participants (86%) reported having taken two or more online courses. This was consistent with the sample population with none of the courses in the study being at the introductory level.

Table 5: Online Courses Taken

	N	Percent
One	17	13.7
Two – five	71	57.3
Six – ten	31	25.0
More than ten	4	3.2
Missing	1	0.8
Total	124	100

Most of the participants (82%) reported that they are or have been graduate students online. Only a small percentage (3%) had taken only undergraduate online courses. Almost 13% had taken both graduate and undergraduate online courses.

Participants were asked if their program of study was available only on-line. This question would allow study into the options that students had with accessing their education. A majority (55%) said that their program was available only online.

There were participants in every age category listed in the survey. The sample was distributed primarily in the 26 – 55 year range (85%). The largest segment of participants (33%) was located in the 46 – 55 age range.

Table 6: Age of the Participants

	N	Percent
18 - 25 years	9	7.3
26 - 35 years	30	24.2
36 - 45 years	34	27.4
46 - 55 years	41	33.1
56 years or higher	9	7.3
Missing	1	0.8
Total	124	100

To determine the geographical distribution of the participants they were asked where they were living currently. In total, 23 countries were represented in the sample. Most reported living in Australia (46%) or Canada (22%). The remaining portion (31%) was distributed amongst a variety of other countries.

Table 7: List of Countries Represented in the Sample.

	N	Percent
Australia	57	46.0
Canada	27	21.8
China	1	.8
Fiji	1	.8
Germany	1	.8
Hong Kong	2	1.6
Indonesia	1	.8
Japan	4	3.2
Kenya	1	.8
Kuwait	1	.8
Macau (China)	1	.8
Malaysia	1	.8
Mauritius	2	1.6
New Zealand	2	1.6
Philippines	1	.8
Qatar	3	2.4
Singapore	1	.8
South Korea	3	2.4
Tanzania	1	.8
Thailand	2	1.6
United Arab Emirates	5	4.0
United Kingdom	3	2.4
USA	1	.8
Missing	2	1.6
Total	124	100.0

Participants were asked if their course instruction was in their first language. Most of the students (90%) received instruction in their first language. Although most reported having English as their first language, 11 other languages were identified as first languages but none to a significant degree. Only Chinese (N = 2) and Creole (N = 2) were identified more than once. The limited variety of languages was not unexpected as a majority of the programs at the Universities in the study are delivered in English.

When asked to rate their computer skills most (79.1%) reported above average or strong skills. This showed a high degree of reported competency amongst the participants in the survey. No one rated himself or herself as having poor computer skills.

Table 8: Self-rating of Computer Skills.

	N	Percent
Fair	1	0.8
Average	25	20.2
Above average	43	34.7
Strong	55	44.4
Total	124	100.0

Summary of background information

The sample had a limited variety in the make up of the participants. The ratio of females to males was 2:1. Participants were on average older than on-campus students and they were living mostly in Australia or Canada. Thirty-one percent represented countries other than Australia and Canada but in this group no one country in particular was strongly represented. Also, despite the diverse countries represented, English was spoken by a majority of the participants. This likely meant that the participants were foreigners living abroad who wished to study by distance in their first language. Many had taken more than two courses and almost all were graduate students. A slight majority reported taking programs available only online. Most of the participants reported having strong computer skills.

Student satisfaction and outcomes

This section was made up of five questions addressing how the participants felt about their online courses. Participants were also asked to report the grades that they

were awarded in their online courses. Grades are commonly used as indicators of student success in online courses.

Three of the four questions in this set had high scores reported. Most of the participants were satisfied with their online experience and would be interested in continuing online studies. The exception was when asked if they enjoyed their experiences as an online student.

Table 9: Student Satisfaction

	N	Mean	SD
Did you find the experience beneficial?	123	4.12	1.297
Did you enjoy being an online student?	122	3.52	1.597
Would you take online courses in the future if given the opportunity?	123	4.19	1.283
Online learning met my needs as a student?	124	4.15	1.178

When asked if they found their experience as an online student beneficial most (80%) agreed. When asked if they enjoyed their experience as an online student a majority (60%) agreed. A significant result was the 31% who disagreed and reported that they did not enjoy their online experience. When asked if they would take online courses in the future, most of the participants (81%) reported that they would take more online courses if given the opportunity. This number seemed high when compared to the 30% reporting that they did not enjoy the experience. When asked if online learning met their needs as students, a large percentage of participants (81%) moderately or strongly agreed.

Table 10 Satisfaction Scale Questions

	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree
Did you find the experience beneficial?	12	6	6	31	69
Did you enjoy being an online student?	24	15	9	22	53
Would you take online courses in the future if given the opportunity?	12	4	7	26	75
Online learning met my needs as a student?	6	12	5	36	65

The results of the recoded grades showed most (79%) of the students in the '75 – 84' and '85 or higher' grade ranges. The results in table 1.11 may be due to the high proportion of graduate students who tend to have higher grades and a narrower range of marks.

Table 11:Grade Received in Online Courses

	N	Percent
50-65	1	.8
65-74	15	12.1
75-84	45	36.3
85 or higher	52	41.9
Total	113	91.1
Missing	11	8.9
Total	124	100.0

Issues around needs not being met

If they answered "strongly disagree" or "moderately disagree" to the question about not having their needs met as an online student, participants were given the opportunity to describe why they felt this way. A small number of participants ($N = 16$) reported not having their needs met by online learning. The following direct quotes from

these individuals give reasons as to why they considered their needs were not being met. Spelling and grammar were not altered in the comments.

> *The assumption appears to be that we sit at a desk in front of a computer all day every day. There appears to be no flexibility in delivery of the materials. On line is excellent for people who are time poor. However it is still not flexible enough to meet my particular needs where because of the nature of my work (paramedic on 24/7 call in a regional area) I need to access study materials in the available time pockets I get between jobs. Having to meet the requirements of being on line at certain times is the same as f2f teaching (Participant 13)*

> *The time requirement was more than distance learning because of the interaction requirement (Participant 14)*

> *Flexibility: Wasn't flexible - Group activities required me to participate even when I couldn't. I was stuck in front of my computer or I had to print off copious amounts of printed materials. Learning Styles: Reading was the only course content - read, read, read. No podcasts, links to other rich learning resources, no video links, graphics organisers were a small gesture but pretty much all ready stating what was obvious. Not harnessing the full benefits of the online environmnet. Bascially taken an external course uploaded the same content and called it Online. (Participant 18)*

> *There was a lot of information that was not relevant to me in my studies and a lot of information that I didn't understand why it related to my course (Participant 20)*

> *I prefer something useful. As a teacher I do my best to ensure I do what I can for each individual student. The course never asked what I knew, what I have done, could/can do, or what do i need or expect, but instead told me that students are not to give their own ideas. So much for free thinking in education. I have been introduced to nothing, repeat nothing that is useful to me as a teacher. Then again as I have been informed by many teachers over the years, 'We all know you don't learn how to teach at Uni.*

Sorry but the experience has not been positive for me. (Participant 27)

It depends on the course facilitator...if they are supportive, it is fine, if they are nor helpful, it can cause problems (Participant 34)

Real time interaction in discussions means that it is difficult to organise required group activities. The amount of online discusssion posts are overwhelming and it is difficult to keep up. (Participant 37)

a social learning experience; any level of deep learning that is memorable. (Participant 38)

too much reading (my worst learning style). Not enough audio or pictures/diagrams. These are far easier than reading for me. Reading is very tiring for me. (Participant 41)

Initially, too much material was needed to be downloaded over the net, whereas a CD with the material sent at the start of the course would have been sufficient. (Participant 50)

After spending 4 years through another University completing a degree, where everything ran smoothly, structured and well laid out I have found USQ to be in most instances the complete opposite. So while I would not consider USQ for online learning again, I certainly would with other universities. (Participant 52)

Interaction with the instructor. Feedback too late on assignments and appeared to be a 'canned' response. (Participant 67)

I much prefer studying in an on-campus environment. I think I learn more efficiently; I like the immediate and real interaction with both peers and the teacher; I feel it's easy

> *to discuss and ask questions to clarify ideas. (Participant 93)*
>
> *Really this was the only viable option for me during shifting work from one location to another and back again over 2 years. I found this much better than prior distance ed experience which was via print materials plus phone hookups some years ago. (Participant 101)*
>
> *Resources were often not available, technical difficulties on the universities part, lack of motivation. (Participant 111)*
>
> *I need more interaction with real people (i.e. face to face) to consolidate and discuss my ideas. (Participant 118)*

All input is important and this list offers an opportunity to enter into the individual experiences of online students. Each comment is a starting point for raising awareness of potential issues that impact online learners.

Summary of student satisfaction and outcomes

This is an area of online education that research suggests has received little attention so it was interesting to analyze the results. Participants answered all of the questions and their responses provided useful insights into learner satisfaction with online education. Participants reported that the online experience was beneficial to them but not by an overwhelming majority. They also indicated that the online learning met their needs as students and most enjoyed the experience. Most participants would take online courses in the future and all reported receiving good to excellent grades.

Course content

This section was designed to examine the usage participants reported with different types of course content and the specific area of academic study in which they were involved. By identifying the type of course content the participants were using, a better understanding of the impact specific types of course content may have in online courses was generated. The six ways of using course content were: (in order of Bloom's Taxonomy of learning) memorizing, demonstrating, application, analysis, combining, and recommending. A high rating on a particular scale indicated that the participant had often used the content in that way. A low score meant that they did not make significant use of that way of interacting with content in their studies. Participants were asked to respond as to whether or not they used specific learning technology in their online courses. The area of study and the name of the program they had been or were a part of was requested. The response set was strong with very little missing data. This section consisted of nine questions.

High scores were reported on all course content questions except for memorizing content. Of all of the content types Demonstrate had the highest score and a low standard deviation.

Table 12: Course Content

	N	Minimum	Maximum	Mean	SD
How often did you memorize information?	123	1	4	2.49	.657
How often did you demonstrate information?	123	3	5	4.35	.665
How often did you apply knowledge?	123	1	5	4.00	.779
How often did you analyze information?	124	2	5	4.06	.684
How often did you combine information?	121	1	5	3.84	.913

	N	Minimum	Maximum	Mean	SD
How often did make recommendations?	122	1	5	4.02	.766
What general category fits the type of content you work with?	123	1	4	1.06	.346

When asked how often they memorized information but did not have to understand it in their online courses, 90% indicated that they rarely or never did this in their online courses.

Table 13: Memorized Information

	N	Percent
Not applicable	5	4.0
Never	59	47.6
Rarely	53	42.7
Often	6	4.8
Very often	0	0.0
Total	123	99.2
Missing	1	0.8
Total	124	100.0

When asked how often they demonstrated their understanding of information in their online courses, most (89%) reported that they were often or very often asked to demonstrate their understanding.

Table 14: Demonstrated Understanding of Information

	N	Percent
Not applicable	0	0
Never	0	0
Rarely	13	10.5
Often	54	43.5
Very often	56	45.2
Total	123	99.2
Missing	1	.8
Total	124	100.0

Participants were asked how often they applied knowledge or used abstract theories to solve problems in their online courses. A majority (75%) reported often or very often.

Table 15: Applied Knowledge to Solve Problems

	N	Percent
Not applicable	1	.8
Never	1	.8
Rarely	28	22.6
Often	60	48.4
Very often	33	26.6
Total	123	99.2
Missing	1	.8
Total	124	100.0

Participants were asked how often they analyzed, or classified information in their online courses. Most (83%) were often or very often asked to analyze or classify information.

Table 16: Analyzed or Classified Information

	N	Percent
Not applicable	0	0.0
Never	2	1.6
Rarely	19	15.3
Often	72	58.1
Very often	31	25.0
Missing	0	0.0
Total	124	100.0

Participants were asked how often they combined information to form a new or unique product in their online courses. A majority (70%) said that they often or very often combined information to form a new or unique project.

Table 17: Combined Information to Form Unique Products

	N	Percent
Not applicable	3	2.4
Never	6	4.8
Rarely	25	20.2

	N	Percent
Often	60	48.4
Very often	27	21.8
Total	121	97.6
Missing	3	2.4
Total	124	100.0

Participants were asked how often they had to make informed decisions or recommendations based on information in their online courses. Most (80%) said that they often or very often made informed decisions or recommendations.

Table 18: Asked to Make Recommendations

	N	Percent
Not applicable	1	.8
Never	3	2.4
Rarely	19	15.3
Often	68	54.8
Very often	31	25.0
Total	122	98.4
Missing	2	1.6
Total	124	100.0

Participants were asked to identify how often certain materials were used in their online courses. Most reported using a variety of different tools and resources in their online courses. The highest usage was with discussion boards (96%) and course delivery systems (97%). These responses indicate a very high usage of these technologies in the online courses. Bulletin boards have proven to be a reliable and easy to use method for getting students to interact. The percentage of online delivery systems used was not 100% as some courses may use stand alone web pages. The lowest usage was with video (36%) and audio (38%). Lower rates of use of the other technologies were reported, probably because it takes time for new technologies to make it into the mainstream of online course delivery.

Table 19: Material used in Online Courses.

Material format	Yes		No	
	N	%	*N*	%
Text-based	102	82.3	22	17.7
Discussion boards	119	96.0	5	4.0
Power Point	55	44.4	69	55.6
Chat, IM, MSN	77	62.1	47	37.9
Course delivery system	120	96.8	4	3.2
Video files	45	36.3	79	63.7
Audio or Podcasts	48	38.7	76	61.3

When asked to identify other computer applications and processes used in their online courses 25 participants responded with a variety of answers. The other materials included Skype or VOIP (*N* = 9), wikis (*N* = 7), blogs (*N* = 5), Flash (*N* = 4), Elluminate (*N* = 3), CD, face-to-face discussion, other multimedia, Paltalk, web design, and photo editing.

When asked to identify the general category that fit the type of content they work with in their studies, most identified education (96.7%). These results support the belief that a variety of new technologies are being introduced into a small number of online courses and programs.

Table 20: Content Studied by Participants

Category	*N*	Percent
Education	119	96.0
Health Sciences	2	1.6
Commerce	1	.8
Fine Arts	1	.8
Arts	1	.8

The final question in this section asked the participants to identify the name of the program they were enrolled in according to their registration guide. Most of the descriptions of the programs participants were enrolled in contained the terms technology, communications, online teaching, learning, teaching, flexible learning. The analysis of the specific programs based on a calendar title showed a breakdown into various categories of programs. The results had 104 specific references to complete programs. Participants

reported being in masters programs (74), graduate diploma programs (18), certificate programs (9), and doctoral programs (3). Other participants were taking courses not identified according to level or program involvement.

Summary of course content

This section had a very high response rate. Participants reported working extensively with course content in every way but memorizing. This shows a broad variety of methodologies being used with course content. The participants also used many different teaching and learning tools. In the open-ended questions they reported using course tools originally not identified in the survey choices. This shows the variety of tools and software available. A review of the category of content showed that most participants were working with an education content focus. Most participants were studying at the Masters level but other post-graduate programs were represented. The study has very little representation of undergraduate students. These results in this section related to program and course type match the findings about course levels in the background information section.

Interaction

The interaction section was designed to investigate the types and intensity of interaction experienced by the participants. This section consisted of 24 questions that examined the interaction between the online learner and their instructor, the online learner and other online learners, and the online learner and course content. The participants were asked to report on their use of a particular technology for interaction and at what level of intensity the interaction may or may not have occurred. A high response rate was recorded in this section. Only the optional questions had low response rates. A complete list of the questions can be found in Appendix H.

Learner instructor interaction

When participants were asked to rate the amount of interaction they had with their instructor using certain tools, discussion boards and e-mail were rated the highest. Participants reported using some or all of the methods for interacting with their instructor but there was an observable difference in intensity between the traditional methods such as e-mail and discussion boards, and other technologies such as videoconferencing, VOIP, and chat. The importance of interaction with the instructor was highly rated by the participants.

Table 21: Interaction with Instructor

Type	*N*	Mean	SD
E-mail	124	3.67	.729
Discussion board	123	3.85	.743
Chat	109	2.85	.815
Videoconference	88	2.13	.369
VOIP	93	2.71	.916
Other	93	3.07	1.052
Interaction with instructor	124	4.00	1.133
Hours per week	122	1.28	.549

When asked if they used e-mail to interact with their instructor, a slight majority (54.5%) reported that they often or very often did. This result may be surprising to some as e-mail is widely accepted as an important form of inter-personal contact in online courses.

Table 22: Used E-mail to Contact Instructor

	N	Percent
Never	2	1.6
Rarely	54	43.9
Often	50	40.7

	N	Percent
Very often	17	13.8
Total	123	99.2
Missing	1	.8
Total	124	100.0

When asked if they used discussion boards to interact with their instructor, 69.7% reported that they did often or very often. This result is consistent with the use of discussion boards to interact. Specifically most interaction with the instructor involved the use of discussion boards with the instructor acting as a moderator for the postings.

Table 23: Used Discussion Boards to Contact Instructor

	N	Percent
Never	3	2.4
Rarely	34	27.6
Often	62	50.4
Very often	23	18.7
Total	122	99.2
Missing	2	1.6
Total	124	100.0

When asked if they used chat to interact with their instructor, 78% of participants reported that they rarely or never used it to interact with their instructor. This result is not surprising as it is still not clear how chat can be used effectively in online learning. When asked how much they used videoconference to interact with their instructor, 90% said never. Similarly, when asked how often they used voice over Internet protocol (VOIP), 77% reported never or rarely.

Also most students used another form of contact to interact with their instructor. When asked what the other means were, participants ($N = 18$) identified the use of programs such as Elluminate ($N = 3$), and Knowledge Garden Wiki ($N = 4$) as well as

University online learning systems, face-to-face contact (*N* = 5), and teleconference (*N* = 5).

Participants were asked about the frequency of contact with their instructor during an average week. Most (76%) reported an hour or less of contact during an average week. They may not engage in long conversations but rather may have a question or concern that can be dealt with in a short period of time. The instructors might not have as great a need to interact if the course is designed and delivered effectively. Also based on the results of previous research online students might not want or need contact.

Table 24: Interaction between Instructor and Student

Hours per week	*N*	Percent
Less than one	92	74.8
1-2 Hours	25	20.3
3-5 Hours	3	2.4
More than 5 hours	1	.8
Total	121	98.4
Missing	2	1.6
Total	123	100.0

Research participants were also asked how they felt about the importance of contact with their instructor. Most (79%) reported it was important to have contact with their instructor. This result shows that even though they might not have a high frequency of contact with their instructor, the ability to have the option is important.

Table 25: Interacting with Instructor was Important

	N	Percent
Strongly Disagree	7	5.6
Moderately Disagree	9	7.3
Undecided	10	8.1
Moderately Agree	49	39.5
Strongly Agree	49	39.5
Total	124	100.0

Interaction between learner and other learners

Participants were asked to rate the amount of interaction they had with other learners in their online courses using various methods. Discussion board usage was the method with the highest frequency of use. The importance of interaction with other learners was also highly rated.

Table 26: Interaction with Other Learners

	N	Mean	SD
E-mail Interaction	121	3.43	.845
Discussion board interaction	123	4.18	.830
Chat interaction	108	3.07	.954
Videoconference interaction	77	2.06	.296
VOIP interaction	90	2.71	.986
Other forms of interaction	35	2.83	1.098
Interacting with other learners important	120	3.89	1.235
How many hours per week	123	2.15	1.000

When asked if they used discussion boards to interact with other learners, 78% reported that they often or very often had. Most online courses have a discussion area where students can exchange ideas, get to know one another, and discuss the content of their courses in a less formal manner.

Table 27: Interacted with Other Learners using Discussion Boards

	N	Percent
Never	3	2.4
Rarely	24	19.5
Often	43	35.0
Very often	52	42.3
Total	122	99.2
Missing	1	.8
Total	123	100.0

When asked if they used e-mail to interact with other learners, 40% indicated that they had done so often or very often. As with interaction using e-mail with instructors,

the participants may not need to directly contact other students. They are more likely to use discussion boards.

Table 28: Interacted with Other Learners Using E-mail

	N	Percent
Never	13	10.5
Rarely	58	46.8
Often	35	28.2
Very often	15	12.1
Total	121	97.6
Missing	3	2.4
Total	124	100.0

When asked if they used chat to interact with other learners, 71% reported rarely or never using it. When asked if they used videoconferencing to interact with other learners 95% reported never using it. A significant number of learners skipped this question and likely did not use it. When asked if they used voice over Internet protocol (VOIP) to interact with other learners, 58% responded rarely or never. A significant number of learners also skipped this question and likely did not use it either.

Participants were asked if they used means other than the specific ways listed to interact with other learners. Fifteen participants identified other means that they used to interact with other learners. Other methods included Elluminate ($N = 4$), Knowledge Garden Wiki ($N = 4$), telephone ($N = 3$), text messaging, and in person.

The amount of interaction with other learners was also measured using the average number of hours they interacted in a week. Participants reported more contact with learners than instructors. The outcomes also show a more even distribution amongst the reported amount of contact time. This may be due to the need for collaboration on coursework, or social interactions that may have occurred.

Table 29: Interaction between Other Learners and On-line Student

Hours per week	*N*	Percent
Less than one	40	32.3
1-2 Hours	37	29.8
3-5 Hours	33	26.6
More than 5 hours	13	10.5
Total	123	99.2
Missing	1	.8
Total	124	100.0

Participants were asked if contact with other online learners was important. A strong majority (75%) agreed that it was important to have contact with other learners. They enjoyed having this option and they used it.

Table 30: Interacting with Other Learners was Important

	N	Percent
Strongly Disagree	8	6.5
Moderately Disagree	15	12.2
Undecided	4	3.3
Moderately Agree	46	37.4
Strongly Agree	46	37.4
Total	119	96.7
Missing	4	3.3
Total	123	100.0

Interaction between learner and content

Participants were asked to rate the amount of interaction they had with their course content using certain methods (see Table 31). Interaction with content using web pages and interaction using discussion boards were both rated highly.

Table 31: Interaction with Content

	N	Mean	SD
Web page interaction	120	4.48	.733
E-mail Interaction	114	3.42	.881
Discussion board interaction	120	4.28	.767
Chat interaction	101	2.88	.898
Other forms of interaction	32	2.75	1.218

When asked if they used the World Wide Web to interact with course content, 88% reported often or very often. This method would be the main form of content delivery for most online courses. Textbooks, reading packages, and other media such as compact discs, DVDs, and videotapes might also be used.

Table 32: Used the World Wide Web to Interact with Content

	N	Percent
Never	3	2.4
Rarely	8	6.5
Often	37	29.8
Very often	72	58.1
Total	120	96.8
Missing	4	3.2
Total	124	100.0

When asked if they used discussion boards to interact with course content, 78% reported often or very often. E-mail was also used but not as extensively as the web or discussion boards with 55 % reporting never or rarely using e-mail to interact with content. E-mail was most commonly used to deliver course content in the form of attachments or as text in the body of the messages.

Table 33: Used Discussion Boards to Interact with Content

	N	Percent
Rarely	23	18.5
Often	41	33.1
Very often	56	45.2
Total	120	96.8
Missing	4	3.2
Total	124	100.0

Table 34: Used E-mail to Interact with Content

	N	Percent
Never	14	11.3
Rarely	54	43.5
Often	30	24.2
Very often	16	12.9
Total	114	91.9
Missing	10	8.1
Total	124	100.0

When asked if they used chat to interact with content, 65% responded that they never or rarely used chat. It is not clear how they would use chat effectively but it is often included as an option in online learning management systems such as Blackboard and WebCT.

Participants were also asked if they interacted with content in ways not included in the list of questions. Eleven participants identified other ways that they interacted with content. These methods included Knowledge Garden Wiki ($N = 5$), Elluminate, streamed video, WebCT, PDF files, text-based books and articles, and online databases.

Difficulty using technology to interact

Participants were asked to report on the amount of difficulty they had using technology in their interactions with their instructor, other learners, and their course content. Overall, participants reported almost no problems using technology to interact in their online courses. This result may be due to online support, the low levels of complexity of the online course delivery systems or may confirm their self-assessed high levels of skills.

When broken into subscales, most students reported having little or no problem using technology to access the instructor (85%), the other learners (86%), or the content (88%).

Table 35: Difficulty Interacting Using Technology

	N	Mean	SD
Difficulty using technology to interact with instructor	123	1.66	1.047
Difficulty using technology to interact with other learners	122	1.61	.975
Difficulty using technology to interact with content	124	1.65	1.022

When presented with the statement that they had difficulty using technology to interact with their instructor, most of the participants disagreed.

Table 36: Difficulty Interacting with Instructor using Technology

	N	Percent
Strongly Disagree	76	61.3
Moderately Disagree	29	23.4
Undecided	5	4.0
Moderately Agree	10	8.1
Strongly Agree	3	2.4
Total	123	99.2
Missing	1	.8
Total	124	100.0

If participants reported strongly or moderately agree to the statement above, they were given an opportunity to explain why they felt this way. Those who did report having difficulty using technology in their interaction with their instructor made the following comments. Again, these statements are verbatim.

> *Experieced small local issues which compound on my ability to complete work. Internet problems, virus spyware (Participant 10)*

> *On many occation the instructor responded immediately, but there were many occations where the instructor was too late in repsonding (ie days/weeks). (Participant 11)*

> *Sometimes the links didn't work or were down and other times my computer blocked them as they were pop ups (Participant 20)*

I find it very impersonal and difficult to explain or receive a response in a simple way that is as easy as discussing an issue face to face. It is a crude means of communication. (Participant 27)

Some instructors web pages were badly designed. (Participant 32)

Technology problems, especially since change in interface at USQ online over the last two years - not user friendly. (Participant 38)

Understanding the operation of wikis was difficult, and I didn't bother to learn to use Skype for the optional online chat sessions because it was too daunting. (Participant 54)

Problems using Skype from home pc. Everything else OK (Participant 79)

Slow internet connection - unsuited to audio conferences. (Participant 86)

WEBCT is trash. (Participant 92)

VOIP did not work. (Participant 95)

Computer viruses. (Participant 117)

They do NOT answer e-mails etc. (Participant 122)

The concerns expressed above do not reflect directly on the instructor but point out the variety of issues that can interfere with the student- instructor communication process.

Participants were also asked if they had any trouble interacting with other learners. Most (86%) disagreed with this statement which further supported the outcome that learners in this study had little trouble using technology to interact.

Table 37: Difficulty Interacting with Other Learners using Technology

	N	Percent
Strongly Disagree	76	61.3
Moderately Disagree	31	25.0
Undecided	4	3.2
Moderately Agree	9	7.3
Strongly Agree	2	1.6
Total	122	98.4
Missing	2	1.6
Total	124	100.0

If participants reported strongly or moderately agree to the statement above, they were given an opportunity to explain why they felt this way. Those who did report having difficulty using technology in their interaction with other learners made the following verbatim comments.

> *use of VOIP by other learners using dial up made communication difficult (Participant 5)*

> *Internet problems, virus spyware (Participant 10)*

> *Discussion board, e-mail was fine, but due to time differences I often missed the chat and I am not very good at it anyway - took a while to feel confident enough to even enter the room. Did not have access to video conferencing facilities, so did not use. Only just heard of SKYPE, will need to find out more, sounds good. (Participant 24)*

> *'I am not comfortable discussing things with unknown people. (Participant 27)*

> *Some group work became very complex and difficult within the confines of the discussion forum (e.g. developing concept maps). (Participant 44)*
>
> *I didn't bother to learn to use Skype for the optional online chat sessions because it was too daunting. (Participant 54)*
>
> *Problems using Skype from home pc. Everything else OK. (Participant 79)*
>
> *again Web CT is trash (Participant 92)*
>
> *VOIP did not work. (Participant 95)*
>
> *problems with chat sessions, not able to be resolved by tech support (Participant 108)*
>
> *In the group I was assigned to, the rest of the students had access to technology that I could not access. Being in Africa, it was difficult for me to participate or aquire it as it was not available. (Participant 112)*

Issues with using technology to interact with other learners were based mostly on the use of VoIP technologies such as Skype. As this technology evolves these issues should become less of a problem.

Participants were also asked if they had any trouble interacting with content. A high percentage (88%) reported little trouble using technology to interact with content.

Table 38: Difficulty Interacting with Content using Technology

	N	Percent
Strongly Disagree	75	60.5
	N	Percent

Moderately Disagree	34	27.4
Undecided	2	1.6
Moderately Agree	10	8.1
Strongly Agree	3	2.4
Total	124	100.0

If participants reported strongly or moderately agree to the statement above, they were given an opportunity to explain why they felt this way. Those who did report having difficulty using technology in their interaction with their course content made the following verbatim comments.

> *I had many problems trying to download lectures! (Participant 11)*

> *I was expected to construct web pages. I was not doing a course on web page construction. The course was Emerging Technologies and I believe it was a waste of time to be expected to be an expert in the technical aspects of web pages rather than understanding the possibilities and applying educationals activities to the technology and using IT people to actually do the IT stuff.(Participant 13)*

> *sometimes the course content wasn't available or wasn't able to be printed from the source so i had to copy and paste which was time consuming and annoying (Participant 20)*

> *A slow internet connection, illogical location of resources, lack of clarification, my own limited IT skills, my own attitude, would much prefer face to face. (Participant 27)*

> *Becasue this course was a new course, there were issues with the technology and it being made available to us. had to spend lots on different programs etc. (Participant 34)*

> *Issues accessing the USQ electronic journal content - my computer crashed during opening and saving pdfs fairly frequently. Would have been easier to just have the pdfs in*

> *the course area, rather than going to the library to get them. (Participant 36)*
>
> *Documents not avaiable on time. Broken hyperlinks. Poor quality of scanning (pdf). Slow network. Submision of assignments was difficult. No standards as to the file structure of available course material (wasted many hours trying to find course material). Difficulty with the EBSCOHOST link. (Participant 50)*
>
> *every course was slightly different, which I found frustrating. Material took a long time downloading. (Participant 52)*
>
> *Owing to my lack of knowledge or to a technological malfunction I may have had some difficulties however most times they were solved either online or with assistance at my computer. (Participant 69)*
>
> *WEB CT is Trash (Participant 92)*
>
> *Very slow Internet connection at home and work - tedious to download required documents and messages. (Participant 95)*
>
> *Work hindered considerably at times by slow and failing connection with USQ and by scheduled maintenance off-line times at times I had scheduled for study. No access to course materials so had to save files of course notes and readings to home computer and had to submit assignments via direct e-mail to tutor instead of through proper channels.(Participant 101)*

Most of the problems related to using technology to interact with content revolved around network or specific program related issues. These results underscore the importance of having an infrastructure that supports all learners and their variety of technology skill levels.

Summary of interaction

When overall interaction was analyzed, discussion boards had the highest frequency of usage. Chat, videoconferencing, and VOIP were not significant factors in any of the interactions in this study. Interaction with the instructor and other learners was important to participants but the intensity and frequency of this interaction was greatest with other learners. Most content interaction was with the World Wide Web but discussion boards were also well utilized. Participants reported no significant difficulty using the technology to interact in the three ways that were studied.

Learner styles

This section consisted of 60 questions designed to classify the learner styles of the participants. In the scale, every sixth question contributed to one of six distinct learner styles. In total, ten items contributed to each ranking on the six learner styles. Participants received a separate rating on each of the six learner styles. The complete list of questions can be found in Appendix G.

The analysis of this section began with the recoding of the negatively coded questions. Negatively coding selected questions was implemented to ensure students were answering the questions thoughtfully and were not just filling in responses to complete the survey because it was long and the questions looked similar.

This was the only section with significant missing data. Frequency counts showed four questions had large numbers of missing values. In the four questions with missing data, two were from the Avoidant category and one each from the Dependent and Collaborative categories. As these questions had more than 10% missing responses, they were excluded from the further data analysis. A closer look at the questions that were

eliminated shows that they were not directly linked to the online environment so their impact on the scale may be less than anticipated and eliminating them may have actually made the scales stronger.

Question 2 “I often daydream during class.” 21 missing values. Avoidant learner style
Question 27 “I like to study for tests with other students.” 19 missing values. Collaborative learner style
Question 40 “My notes contain almost everything the teacher covers in class.” 18 missing values. Dependent learner style
Question 44 “I typically prepare for exams long before I write them.” 21 missing values. Avoidant learner style

All questions were regrouped and presented in the following table to show how they contributed to the different scales. The highest scores were found in the Independent scale. The Competitive scale had the lowest scores and the narrowest range.

Table 1.39: Learner style scale statistics

	N	Mean	SD
Independent scale			
1. I prefer to work by myself on assignments in my courses.	124	3.95	1.209
7. My ideas about the content often are as good as those of my instructor.	119	3.08	1.151
13. I study what is important to me and not always what the instructor says is important.	122	3.14	1.307
19. I learn a lot of the content in my classes on my own.	121	4.02	.961
25. I feel very confident about my ability to learn on my own.	123	4.35	.975
31. I like to develop my own ideas about course content.	124	3.73	1.060
37. I have my own ideas about how classes should be run.	121	3.50	1.148
43. If I like a topic, I try to find out more about it on my own.	123	4.37	.918
49. I prefer to work on class projects and assignments by myself.	120	3.92	1.026
55. When I don't understand something, I first try to figure it out for myself.	124	4.60	.538
Avoidant scale			
2. I often daydream during class.	103	2.55	1.319
8. Online activities are usually boring.	122	2.12	1.154
14. I am very seldom excited about my course material.	121	2.06	1.227
20. I attend most of my scheduled online sessions.	117	3.70	1.347

	N	Mean	SD
26. Paying attention during online sessions is difficult for me to do.	115	2.24	1.182
32. I have given up trying to learn anything from participating in class.	117	1.75	1.050
38. I study just hard enough to get by.	124	2.30	1.349
44. I typically prepare for exams long before I write them.	103	3.18	1.334
50. I would prefer that teachers do not give extra attention to me.	117	2.94	1.154
56. During online sessions, I tend to socialize with other students.	114	3.20	1.235
Collaborative scale			
3. Working with other students on class activities is something I enjoy doing.	120	3.47	1.223
9. I enjoy discussing my ideas about course content with other students.	122	3.93	1.092
15. I enjoy hearing what other students think about issues raised in class.	124	4.35	.920
21. Students should be encouraged to share more of their ideas with each other.	122	4.07	1.038
27. I like to study for tests with other students.	106	2.36	1.244
33. Online sessions make me feel like part of a team where people help each other learn.	123	3.67	1.211
39. An important part of taking courses is learning to get along with other people.	123	3.76	1.066
45. Learning the material was a cooperative effort between students and teachers.	119	3.66	1.202
51. I am willing to help other students when they do not understand something.	121	4.45	.816
57. I enjoy participating in small group activities.	121	3.71	1.114
Dependent scale			
4. I want teachers to state exactly what they expect from students.	122	4.55	.762
10. I rely on my teachers to tell me what is important for me to learn.	123	2.68	1.270
16. I want clear and detailed instructions on how to complete assignments.	122	4.40	.888
22. I complete assignments the way my teachers tell me to do them.	122	4.25	.719
28. Trying to decide what to study or how to do assignments makes me uncomfortable.	122	2.62	1.319
34. Students should be closely supervised by teachers on course projects.	123	2.85	1.259
40. My notes contain almost everything the teacher covers in class.	106	2.97	1.215
46. I prefer class sessions that are highly organized.	119	3.91	1.025
52. Students should be told exactly what material is to be covered on exams.	112	3.73	1.208
58. I want teachers to have outlines or notes available to me.	120	4.22	.936
Competitive scale			
5. To do well, it is necessary to compete with other students for the teacher's attention.	121	1.71	.926
11. It is necessary to compete with other students to get a good grade.	121	2.00	1.211
17. In class, I must compete with other students to get my ideas across.	118	2.06	1.104
23. Students have to be aggressive to do well in courses.	118	1.81	1.132

	N	Mean	SD
29. I like to solve problems or answer questions before anybody else can.	121	2.58	1.181
35. To get ahead in class, it is necessary to step on the toes of other students.	123	1.27	.702
41. Being one of the best students in my classes is very important to me.	121	3.21	1.378
47. To stand out in my classes, I try to complete assignments better than other students.	115	2.65	1.351
53. I would like to know how well other students are doing on exams and course assignments.	120	3.12	1.285
59. I want my teachers to give me more recognition for the work I do.	120	2.74	1.213
Participant scale			
6. I do what is asked of me to learn the content in my classes.	121	4.03	.991
12. Online sessions are typically worth participating in.	122	3.93	1.122
18. I get more out of working with my classmates than working alone.	123	3.08	1.164
24. It is my responsibility to get as much as I can out of a course.	124	4.70	.786
30. I find most online course activities to be interesting.	124	3.69	1.142
36. I try to participate as much as I can in all aspects of a course.	123	4.10	1.134
42. I do all course assignments well whether or not I think they are interesting.	122	4.11	.955
48. I typically complete course assignments before their deadlines.	120	3.00	1.390
54. I complete required assignments as well as those that are optional.	119	3.24	1.289
60. I am always prepared to participate in my online course sessions.	121	3.95	1.132

After completing the frequency analysis, the results of the specific learner style questions were analyzed. Each learner scale section consisted of ten statements which were reviewed to determine those that had responses greater than 4.00. Any response of 4.00 or higher was recorded as a high response. Overall, the statements did have a number of high responses expressed by the participants. In the Dependent learner style, participants rated 4 of the questions highly. The Independent scale had a high rating on 4 statements. Participation scale also had a high rating on 4 out of 10 statements. Collaborative had 3 statements rated highly. Both the Competitive and Avoidant sections had no responses in the 4.00 or higher range. These two learner styles had the most ratings on the low end of the scales with scores of 2.00 or less.

The statements that rated most highly or had the strongest responses were:

Dependent learner style.

Question 4: *I want teachers to state exactly what they expect from students.* 92.5% moderately agree or strongly agree.

Question 16*: I want clear and detailed instructions on how to complete assignments*. 88.4% moderately or strongly agree.

Question 22: *I complete assignments the way my teachers tell me to do them.* 90.1% moderately or strongly agree.

Question 58: *I want teachers to have outlines or notes available to me.* 87.4% strongly or moderately agree.

Competitive learner style.

Question 5: *To do well, it is necessary to compete with other students for the teacher's attention*. 84.3% strongly disagree or moderately disagree.

Question 35: *To get ahead in class, it is necessary to step on the toes of other students.* 84.4 % strongly disagree.

Participant learner style.

Question 6: *I do what is asked of me to learn the content in my classes.* 85% Moderately or strongly agree.

Question 24: *It is my responsibility to get as much as I can out of a course.* 81.3% strongly agree.

Independent learner style.

Question 25: *I feel very confident about my ability to learn on my own.* 88.5% moderately or strongly agree.

Question 43: *If I like a topic, I try to find out more about it on my own.* 90.9 % strongly or moderately agree.

Question 55: *When I don't understand something, I first try to figure it out for myself.* 99.2% strongly or moderately agree.

Collaborative learner style.

> Question 51: *I am willing to help other students when they do not understand something.* 94.2% strongly or moderately agree.

The individual responses were collapsed and averages for all the learner style sections were calculated. The overall responses gave a breakdown of these six levels for each of the participants. The results are a score out of five for the particular learning style. These results mirrored the individual question analysis.

Table 40: Learner Style Average Scores

	N	Mean	Median	Mode	S.D.
Independent	124	3.8113	3.9000	3.90	.52160
Avoidant	124	2.4105	2.4000	2.40	.52496
Collaborative	124	3.6435	3.7000	3.30	.76064
Dependent	124	3.4798	3.5000	3.50	.59154
Competitive	124	2.2339	2.2000	1.40	.71997
Participant	124	3.7234	3.7000	3.90	.58032

Each of the learner style scales were recoded to give the breakdown of where participants reported they were on each scale. Participants rated themselves highest on the Independent (82%) and Participant (79%) scales and lowest on the Avoidant (67%) and Competitive (69%) scales.

Table 41: Recode of Learning Style Scales

Learning style	Low		Moderate		High	
	N	%	*N*	%	*N*	%
Independent	3	2.4	19	15.3	102	82.3
Avoidant	83	66.9	37	29.8	4	3.2
Collaborative	17	13.7	23	18.5	84	67.7
Dependent	10	8.1	37	29.8	77	62.1
Competitive	85	68.5	32	25.8	7	5.6
Participant	7	5.6	19	15.3	98	79.0

Summary of learner styles

The learner style section had a good response rate to the majority of questions. This section provided a comprehensive overview of how the students rated themselves as learners. Those learning styles that contribute to being a successful student were highly rated. The characteristics that would be considered negative were rated lowest.

Follow-up data analysis

The purpose of this section was to search for any unanticipated outcomes from the data. The further analysis was conducted on all five sections.

Background information

Individual items on the background information scale were compared using crosstabs. When age was compared to number of courses, the highest numbers were found in the 26 – 55 age ranges with 36 – 45 being the highest. This result is consistent with the higher number of graduate students in the sample.

Table 42: Age Compared to Number of Courses

Number of courses	Age				
	18 - 25 years	26 - 35 years	36 - 45 years	46 - 55 years	56 years or higher
One	3	4	5	3	2
Two – Five	3	18	24	22	3
Six – Ten	2	7	5	14	3
More than Ten	1	1	0	1	1
Total	9	30	34	40	9

When gender was compared to the number of courses taken, a higher concentration of females (61%) had taken between two to five courses as compared to males (50%).

Table 43: Gender compared to number of courses

How many courses	Gender	
	Female	Male
One	10	7
% within gender	11.8%	18.4%

	Female	Male
% of Total	8.1%	5.7%
Two - Five	52	19
% within gender	61.2%	50.0%
% of Total	42.3%	15.4%
Six - Ten	21	10
% within gender	24.7%	26.3%
% of Total	17.1%	8.1%
More than Ten	2	2
% within gender	2.4%	5.3%
% of Total	1.6%	1.6%
Total	85	38

Gender compared to course type showed more females had taken both graduate and a combination of both. The results were particularly significant in that of 16 who had taken both undergraduate and graduate 15 were female and only one was male. This outcome supports the idea that the females make more of their opportunities to participate in online learning.

Table 44: Gender Compared to Type of Courses

Course type	Gender		Total
	Female	Male	
Graduate	67	35	102
Undergraduate	2	2	4
Both	15	1	16
Total	84	38	122

The comparison of age and type of courses taken support previous outcomes that highest percentage of those taking graduate courses were found in the 26 – 55 age range at 85.2%. The highest total of graduate students was found in the 46 – 55 age range.

When computer skills were compared to gender females tended to assess themselves as average more than men. When it came to the upper levels of Above

average, the rating was even and with strong males rated themselves more highly than females. Females were distributed more evenly on all of the different ability rating levels.

Table 45: Computer Skills Compared to Gender

Computer skills	Gender		Total
	Female	Male	
Fair	1	0	1
Average	21	4	25
Above average	29	14	43
Strong	34	21	55

When computer skills were compared to the number of courses studied, if a participant had taken more than one course they were more likely to report strong or above average computer skills. Regardless of the number of courses taken, almost no participants reported having fair skills.

When the number of courses taken was compared to computer skills in each of the categories, the more courses the participant had taken the higher the rating they gave on their level of computer skills.

Table 46: Number of Courses Compared to Computer Skills

Number of Courses	Computer skills				Total
	Fair	Average	Above average	Strong	
One	0	5	7	5	17
Two - Five	1	18	27	25	71
Six - Ten	0	2	9	20	31
More than Ten	0	0	0	4	4

When the computer skills of those who could access their program only online were compared to those that had a choice, there was no significant difference. This may mean that computer skill level is not a significant factor in choosing to study online.

Table 47: Program Available Online Compared to Computer Skills

Available only online	Computer skills				Total
	Fair	Average	Above average	Strong	
Yes	1	13	26	28	68
No	0	11	16	23	50

The availability of online programs was compared to country. Those in Australia and other countries had fewer opportunities to choose from than those from Canada who had more options when it came to choosing between online and face-to-face.

Table 48: Program Available Online Compared to Country of Residence

		Participant Country			Total
Was the program only available online		Australia	Canada	Other	
Yes	Count	35	7	24	66
	% within country	62.5%	29.2%	66.7%	56.9%
	% of Total	30.2%	6.0%	20.7%	56.9%
No	Count	21	17	12	50
	% within country	37.5%	70.8%	33.3%	43.1%
	% of Total	18.1%	14.7%	10.3%	43.1%
	% of Total	48.3%	20.7%	31.0%	100.0%

Grades were compared to gender which showed that just under half (46%) of both males and females reported scoring grades in the highest level. There was no significant difference between genders in the analysis of grades. A comparison of grades and age showed that participants with high grades were found in the 26 – 55 age range and those participants who reported receiving the highest grades were found in the 46 – 55 year old range, just slightly ahead of the 36 – 45 year range.

A comparison of the number of courses taken and grades showed that those with more online courses reported receiving higher grades. Also the more online courses a participant had taken the more likely their grades would be found in the top end of the scale as compared to those who had fewer courses who reported more variation in their grades.

Table 49: Comparison of Number of Online Courses and Grades

	Grades				Total
	50-65	65-74	75-84	85 or higher	
One	0	1	8	3	12
Two - Five	1	8	20	37	66
Six - Ten	0	6	15	10	31
More than Ten	0	0	2	2	4
Total	1	15	45	52	113

A comparison of computer skills and age showed an even distribution amongst all but the youngest and oldest age categories. The highest percentage of participants who reported strong computer skills was found in the 46 – 55 year old category.

Table 50: Computer Skills Compared to Age

Computer skills	Age				
	18 - 25 years	26 - 35 years	36 - 45 years	46 - 55 years	56 years or higher
Fair	0	0	0	1	0
% of Total	.0%	.0%	.0%	.8%	.0%
Average	1	5	6	10	3
% of Total	.8%	4.1%	4.9%	8.1%	2.4%
Above average	4	12	12	11	3
% of Total	3.3%	9.8%	9.8%	8.9%	2.4%
Strong	4	13	16	19	3
% of Total	3.3%	10.6%	13.0%	15.4%	2.4%
Total	9	30	34	41	9

A comparison of self-rated computer skills and grades show very little difference between groups. Those who reported fair to average computer skills were able to achieve

high grades. This result is interesting as one would expect computer skills to play a significant part in the success of an online student. It may mean that participants were rating themselves lower than they actually were or that being a successful online student is due to other factors. It does not tell us if those with weaker computer skills had to work harder to achieve similar levels of success as those with stronger skills.

Table 51: Comparison of Computer Skills and Marks

Computer skills	Marks				Total
	50-65	65-74	75-84	85 or higher	
Fair	0	0	0	1	1
Average	0	6	11	7	24
Above Average	0	6	12	20	38
Strong	1	3	22	24	50
Total	1	15	45	52	113

Course content

A comparison of the items in the course content section (table 1.52) showed that ten out of the fifteen items showed a positive correlation with each other with a high to moderate significance. The strong positive relationships highlight the connection between most of the forms of course content. Only the lowest level of course content, memorization of course content, showed a negative relationship with four of the five other items in the scale. This was consistent with few participants being asked to use their course content in this manner. The lack of memorization in graduate level courses shows that the students are being challenged to think at higher levels.

Table 52: Correlations of Course Content Items

	How often Memorize	How often Demonstrate	How often Apply	How often Analyze	How often Combine
How often Demonstrate	-.187*				
How often Apply	-.096	.475**			
How often Analyze	-.026	.462**	.386**		
How often Combine	-.072	.256**	.362**	.366**	
How often Recommend	.009	.340**	.362**	.408**	.447**

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The course content scales were not combined into an overall mean but left as six separate scales. Crosstabs and other comparative methods of analysis were not used in this section as most of the students fell into the education program category.

The results of the question about the program showed that the students reported being in Masters programs (74), Graduate diploma programs (18), Certificate programs (9), and Doctoral programs (3). The remaining 20 students reported being involved in undergraduate programs or courses and not part of a formal program.

Interaction

The three interaction sub-scales were combined to create an overall score for each participant. The mean was also calculated for the three sub-scales of interaction with instructor, with other learners, and with course content. Inter-item correlations analysis was conducted on the items in the three interaction sub-scales. The results (see Table 53 below) show both high and significant correlations between many of the items.

Results of the inter-item correlation of interaction between the learner and instructor showed a moderate correlation with the use of discussion boards and e-mail. There were high correlations with other methods and chat, discussion, and e-mail.

Table 53: Comparison of Student Instructor Interaction

	E-mail	Discussion	Chat	Videoconference	VOIP	Other	Contact important
Discussion	.452**						
Chat	.158	.401**					
Videoconference	.273**	.151	.154				
VOIP	.108	.267**	.611**	.089			
Other	.531**	.679**	.768**	.065	.795**		
Contact important	.118	.330**	.375**	-.038	.268**	.444*	
Average hours	.411**	.296**	.321**	.203	.050	.132	.237**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Inter-item correlation with interaction between learners showed strong and moderate correlations with high degrees of significance.

Table 54: Correlations of Interaction with Other Learners

	E-mail	Discussion boards	Chat	Videoconference	VOIP	Other
Discussion boards	.360**					
Chat	.436**	.254**				
Videoconference	.226*	.158	.101			
VOIP	.226*	.203	.596**	.284*		
Other	.606**	.311	.602**	.337	.810**	
Other learners important	.367**	.496**	.318**	.097	.347**	.443**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Inter-item correlation of interactions with course content showed many moderate and highly significant connections. E-mail was especially connected to the other means of working with content.

Table 55: Correlations Interaction with Course Content

	Web content	E-mail content	Discussion board content	Chat content
E-mail content	.101			
Discussion board content	.158	.354**		
Chat content	.000	.343**	.294**	
Other content	-.148	.575**	.336	.780**

** Correlation is significant at the 0.01 level 2-tailed.

Inter-item correlations of interaction sub-scales showed high significance and strong correlation between interaction with instructor and interaction with other learners.

Table 56: Correlation between Interaction Subscales

	Instructor interaction	Other learner interaction
Other learner	.620**	
Content	.303**	.334**

** Correlation is significant at the 0.01 level (2-tailed).

The interaction scale, which consisted of 24 items, was then recoded into two sets of interaction categories (high and low; and high, medium, and low) to answer the research questions. The recoding was conducted for overall interaction and the three interaction subscales.

Table 57: Two variable Interaction Recode

Overall interaction	*N*	Percent
Low interaction	77	62.1
High interaction	47	37.9
Total	124	100.0
Instructor Interaction		
Low interaction	97	78.2
High interaction	27	21.8
Total	124	100.0
Other learners		
Low interaction	90	72.6
High interaction	34	27.4
Total	124	100.0
Content		
Low interaction	38	30.6
High interaction	86	69.4
Total	124	100.0

The distribution was weighted more towards those who reported low interaction except when interaction with content was the focus. The analysis of instructor interaction using a two variable scale shows the majority of participants (78%) reported a low level of interaction. The analysis of other learner interaction using a two variable scale shows the majority of participants (73%) reported a low level of interaction. The analysis of content interaction using a two variable scale shows majority of participants (69%) reported a high level of interaction.

After the analysis of the two categories of interaction, the interaction scales were then recoded to group the participants into high, moderate, or low interaction. The recoding was conducted to create three categories of frequency to look for any other outcomes that could be realized by a finer analysis of the participants. These results also provided the basis for the analysis of variance that was conducted later in the research. The overall rating of interaction showed an even distribution amongst the participants with high and low rating close to one another. This set of results also showed low interaction with instructor and other learners and high interaction with content.

When recoded into three levels of interaction, the results were evenly distributed amongst the three categories.

Table 58: Three Category Recode of Overall Interaction

	N	Percent
Low interaction	45	36.3
Moderate interaction	32	25.8
High interaction	47	37.9
Total	124	100.0

The analysis of interaction with instructor using a three category scale showed the majority of participants (62%) reported a low level of interaction. Analysis of interaction with other learners showed the majority of participants (62%) reported a low level of interaction. The analysis of course content interaction showed that the majority of participants (72%) reported high levels of interaction.

The analysis of correlation between the three possible methods of interaction using technology showed a strong connection between the three. A negative relationship was observed between computer skills and the three difficulty scales. This result showed that those with higher levels of computer skills experienced less difficulty using technology to interact.

Table 59: Difficulty using Technology for Interaction Compared to Computer Skills

	Difficult tech instruct	Difficult tech other learners	Difficult tech content
Difficult tech other learners	.729**		
Difficult tech content	.515**	.462**	
Computer skills	-.165	-.163	-.201*

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The difficulty with technical interaction was also combined into a single scale. The questions were negatively worded so a low score is a positive result on these questions. Based on these results, there were few participants who reported difficulty using technology to interact.

Table 60: Overall Difficulty using Technology to Interact

	N	Percent
Low	113	91.1
Moderate	1	.8
High	6	4.8
Total	120	96.8
Missing	4	3.2
Total	124	100.0

Summary

Correlations showed strong connections among the three sub-scales of interaction. When recoded into two categories, most participants were rated as low interactors except with content where participants rated themselves as high interactors. When recoded into three categories of interaction, the results were similar. More participants rated themselves as high interactors rather than low interactors but just slightly more. Interaction with instructor and other learners was low and interaction with content was high. Other results showed the importance of course content, as this was the major type of interaction reported by the student. Participants reported no significant problems interacting using technology. Analysis showed no significant correlation between self-reported computer skills and any problems using technology to interact.

Learner styles

This section compared the average scores on the learner styles scales using Pearson's correlation. The negative correlations for Participant/Avoidant and Collaborative/Independent scales make sense although the results are not significant. In both groupings, the pairs were found in opposite collapsed learner scales. The positive comparisons of Collaborative/Participant and Competitive/Dependent show low to moderate correlation and high significance. These groupings were found in the same collapsed learner style scales.

Table 61: Correlations of Average Learner Style Scales

	Independent	Avoidant	Collaborative	Dependent	Competitive
Avoidant	.002				
Collaborative	-.036	-.006			
Dependent	.042	.132	.206*		
Competitive	.008	.109	.117	.239**	
Participant	.138	-.134	.378**	-.049	.154

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The learner styles results were combined into two distinct categories and a mean score was calculated for each. The first mean category combined the learner scale characteristics of Independent, Collaborative, and Participant. These three learner styles were viewed as contributing positively to online learning. These three sub-scales had the highest mean scores and according to Logan and Thomas (2003) are most consistent with successful online students. The second mean combined the learner style characteristics of Avoidant, Competitive, and Dependent. These three learner styles contributed negatively to online learning. The questions in the negative learner style grouping received the three lowest mean scores.

Recoding of the positive learning style scores showed that 84% of participants rated high in the combination of the three characteristics that combined to create a positive influence with online learners.

Table 62: Mean Positive Learner Characteristics

	N	Percent
Low	3	2.4
Moderate	17	13.7
High	104	83.9
Total	124	100.0

Recoding of the negative learning style scores showed that 7% of participants rated high in the combination of the three characteristics that combined to create a negative influence with online learners. As indicated in the table below, a slight majority of participants rated moderately on the negative group score.

Table 63: Mean Negative Learner Characteristics

	N	Percent
Low	48	38.7
Moderate	67	54.0
High	9	7.3
Total	124	100.0

When compared to the positive learners style, the outcomes for negative style show a more even distribution. More participants rated themselves in the low and moderate categories. Few participants rated themselves highly on the negative scale.

When the positive learner style scores are compared to grades, the results show very few participants are found in the low positive category. The greatest number of the participants was found in the high positive range of the learner style scale and the 85 or higher grades category.

Table 64: Comparison of Grades and Positive Learner Styles

	Positive Learner style		
Grades	Low	Moderate	High
50 – 65	0	0	1
65 – 74	0	4	15
75– 84	1	5	45
85 or higher	1	7	52
Total	2	16	95

When the negative learning style scores were compared to grades, the results showed that a majority of participants fall into the low or moderate range of the learner style scale with 85 or higher grades.

Table 65: Comparison of Grades and Negative Learner Styles

	Negative Learner style		
Marks	Low	Moderate	High
50 – 65	0	1	0
65 – 74	5	8	2
75– 84	16	28	1
85 or higher	23	25	4
Total	44	62	7

Summary

There were no strong correlations between individual learner style scales. When grouped into the two categories of positive learner style and negative learner style, the highest rating for most participants was found on the positive learner style scale. The lowest rating for most participants was found on the negative learner style scale. Those participants who reported high marks were likely to be on the high end of the positive learner scale.

Satisfaction section

A Pearson inter-item correlation was carried out on the four items in the learner satisfaction scale.

Table 66: Correlation of Student Satisfaction Scale

	Found experience beneficial	Enjoyed being online student	Will take opportunity in future
Enjoyed being online student	.062		
Will take opportunity in future	.650**	.047	
Online learning met needs	.632**	.129	.642**

** Correlation is significant at the 0.01 level (2-tailed).

A moderate correlation was present between three of the four items looking at student perception. The question asking participants if they enjoyed their online experience was weakly correlated to the other three items. The Alpha score on this scale also showed that the elimination of the question about enjoying the online experience would boost the score to .842. Due to these results the second question was eliminated from the scale.

A mean of the factors contributing to the satisfaction of the learners was recoded into high, moderate, or low levels of overall satisfaction. The results of this recode showed that 79% of participants rated themselves as highly satisfied with their online learning.

Table 67: Satisfaction with Online Learning

	N	Percent
Low	13	10.5
Moderate	13	10.5
High	98	79.0
Total	124	100.0

The table below shows that correlations between interaction measures and satisfaction were low but highly significant. We can see that the more interaction the more satisfaction. The highest level of satisfaction was found with other learners and content.

Table 68: Correlations Interactions and Satisfaction

	Instructor interaction	Other learner Interaction	Content Interaction
Satisfaction	.200*	.246**	.273**

**Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The collapsed learning style scales were compared to satisfaction. The results show that those who rated highly on the positive learner scale also classified as highly satisfied. Those who rated low on the negative learning style rated high or moderate on satisfaction.

Table 69: Collapsed learning styles compared to satisfaction

	Level of Satisfaction			Total
Positive scale	Low	Moderate	High	
Low	3	0	0	3
Moderate	2	2	13	17
High	8	11	85	104
Total	13	13	98	124
Negative scale	Low	Moderate	High	
Low	7	3	38	48
Moderate	5	9	53	67
High	1	1	7	9
Total	13	13	98	124

An ANOVA comparing these three groups found a significant difference (F = (2, 121), 7.380 p = .001). The significance between groups was found in the comparison of the high and low (p = .001) and the low and moderate (p = .018). The *t*-test that compared the Positive learner scale and satisfaction showed a significant difference (t (122) = 3.052, p = .003) between group results in that the higher the score on the positive learner style the more likely the participants would score highly on the satisfaction scale.

The *t*-test results show similar results in a comparison of negative learner style and satisfaction. An ANOVA comparing these three groups had a result of (F (2, 121) = .846 p = .432). There were no significant differences between satisfaction groups on the negative learner scale (t (122) = .292 p = .770). T-tests also conducted to compare overall satisfaction with gender. The groups were based on female N = 85 and male N = 39. These results were not significant either with the score being t (122) = .874, p = .384. Using high, moderate, and low levels of satisfaction the result was t (122) = 1.707, p = .090. Overall there was no observed difference in satisfaction between groups.

Gender and overall satisfaction were compared to see if there were any differences between male and female participants. A crosstab comparison between

gender and high and low satisfaction show 81% overall satisfied. Slightly more females (84%) than males (77%) reported that they were satisfied. From these results the conclusion can be made that gender was not a determining factor in learner satisfaction.

A further analysis of gender in areas of satisfaction showed that most males and females agreed that online learning met their needs. A slightly higher percentage of females rated strongly agree. A comparison of gender and belief that online learning met the needs of the student showed both males and females had their needs met. There was no observed difference between genders.

Table 70: Gender and Online Learning Met Needs

	Gender		Total
	Female	Male	
Strongly Disagree	2	4	6
Moderately Disagree	9	3	12
Undecided	3	2	5
Moderately Agree	22	14	36
Strongly Agree	49	16	65
Total	85	39	124

A majority of both males and females will take more online courses in the future. More females strongly agreed at 65% compared to 51% of males. A comparison of gender and taking courses in the future showed more males (18%) than females (11%) would not take another course. Overall a higher proportion of females than males would take online courses in the future.

Table 71: Comparison of Gender and Willingness to Take Online Courses in the Future.

Take more courses	Gender		Total
	Female	Male	
Strongly Disagree	6	6	12
Moderately Disagree	3	1	4
Undecided	6	1	7
Moderately Agree	15	11	26

	Female	Male	Total
Strongly Agree	55	20	75
Total	85	39	124

More than one-quarter (28%) of males disagreed with the statement they found the experience beneficial compared to only 8% of females who did not find the experience beneficial. A majority of females strongly agreed that the online experience was beneficial.

Table 72: Comparison Gender and Experience Beneficial

Found experience beneficial	Gender		Total
	Female	Male	
Strongly Disagree	6	6	12
Moderately Disagree	1	5	6
Undecided	4	2	6
Moderately Agree	22	9	31
Strongly Agree	52	17	69
Total	85	39	124

A comparison of gender and enjoyment of courses showed more females (50%) than males (30%) enjoyed the experience. Interestingly, 30% of males disagreed that they enjoyed being an online student. Females reported a much higher frequency of “strongly agreed” than males in this analysis. The distribution showed the strong responses of the participants with high numbers at the top and bottom of the scales and very few participants rating themselves as undecided.

Table 73: Comparison of Gender and Enjoyed Online Study

Enjoyed being an online student	Gender		Total
	Female	Male	
Strongly Disagree	13	11	24
Moderately Disagree	8	7	15
Undecided	5	4	9
Moderately Agree	16	6	22
Strongly Agree	42	11	53
Total	84	39	123

For those whose program was available only online, Table 74 shows that more than one third (35%) agreed that they enjoyed being an online student. For those who had a choice the number who enjoyed it fell to 23%. Those without a choice may have seen a need to be happy with what they had.

Table 74: Only Available Online Compared to Enjoyed Course

Available online	Enjoyed online student					Total
	Strongly Disagree	Moderately Disagree	Undecided	Moderately Agree	Strongly Agree	
Yes	10	9	6	12	30	67
No	13	6	3	9	19	50
Total	23	15	9	21	49	117
% of Total	19.7%	12.8%	7.7%	17.9%	41.9%	100.0%

Satisfaction outcomes with two variables were compared to gender (females N = 85 and males N = 39) to determine any differences with overall satisfaction. Results show no significant difference between the genders when it comes to satisfaction (t (122) =1.707, p >. 05). An analysis of variance with satisfaction being divided into three categories also shows similar results. A comparison of satisfaction means between genders showed no significant difference (t (122) =.874, p = .384).

Analysis specific to the Research Questions

Research Question One

What is the relationship between learner styles and amount of interaction experienced by students?

In the initial stage of the analysis inter-item correlations were used to examine the strength of the relationships between the individual items in the scales.

In Table 75 overall interaction was compared to each of the learner styles. The correlation between the individual learner styles was also analyzed.

Table 75: Correlations of Combined Learner Styles and Overall Interaction

	Overall	Independent	Avoidant	Collaborative	Dependent	Competitive
Independent	.090	–				
Avoidant	-.167	.002	–			
Collaborative	.336**	-036	-.006	–		
Dependent	-.089	.042	.132	.206 (*)	–	
Competitive	-.028	.008	.109	.117	.239(**)	–
Participant	.296**	.138	-.134	.378(**)	-.049	.154

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The strongest correlations were between overall interaction and Collaborative learner style with a high degree of significance, and overall interaction and Participant learner style also with high significance. The correlation result between Participant and Collaborative learner styles was also highly significant. Both separately and together Participant and Collaborative learner styles had a significant impact on overall interaction.

Each of the interaction subscales was compared to the learner styles.

Table 76: Learner Styles and Interaction Subscales

Learner Style	Interaction Type		
	Instructor	Other learner	Content
Independent	-.013	.088	-.045
Avoidant	-.040	-.168	-.142
Collaborative	.210 (*)	.249(*)	.163
Dependent	-.011	.074	-.184
Competitive	-.063	-.065	-.024
Participant	.240(*)	.157	.260(**)

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Collaborative learner style had a low but significant correlation with interaction with instructor and interaction with other learners. Participant learner style had low scores on the scales that were based on interaction with instructor and interaction with content and the significance was high.

T-tests were used to compare mean scores on each of the learner style dimensions for groups that reported high or low interaction.

Table 77: Comparison of Mean Scores on Interaction and Learner Styles

Learning style	Mean	SD	df	t	p
Independent	2.808	.435	122	-0.998	.320
Avoidant	1.346	.534	122	1.380	.170
Collaborative	2.588	.665	122	-3.058**	.003
Dependent	2.535	.647	122	0.400	.690
Competitive	1.373	.580	122	-0.176	.860
Participant	2.773	.450	122	-0.328**	.001

* Correlation is significant at the 0.05 level.
** Correlation is significant at the 0.01 level.

This analysis used interaction categories of high and low (high interactors $N = 47$, low interactors $N = 77$). The results of this analysis show significant differences between the two group means in both the Collaborative and Participant learner style categories. The higher the reported interaction the more likely the individual was to score highly on the Collaborative or Participant leaner styles.

Further analysis using an ANOVA examined the relationship between the different types of course content and the interaction reported by the participants. The participants were divided into three categories of high ($N = 47$), moderate ($N = 32$), and low interaction ($N = 45$). The results showed strong differences in the Collaborative and Participant groups. With the Collaborative group there were significant differences between high and low and high and moderate. With the Participant group the differences were between high and low groups.

Table 78: Analysis of Variance between Interaction and Learner Styles

Learner style	Mean	SD	df	F	p
Within Subjects					
Independent	2.798	.459	122	0.523	0.594
Avoidant	1.363	.546	122	1.951	0.147
Collaborative	2.540	.726	122	8.097**	0.001
Dependent	2.540	.643	122	1.051	0.353
Competitive	1.371	.591	122	0.544	0.582
Participant	2.734	.557	122	5.828**	0.004
Between Subjects					
Collaborative		High/low			0.001
		Low/Moderate			0.033
Participant		High/Low			0.003

* Correlation is significant at the 0.05 level.
** Correlation is significant at the 0.01 level.

The positive learner styles were groupings of three characteristics from the learner style scale that promoted success in online learners. The negative learner styles were groupings of three characteristics from the learner style scale that did not promote success in online learners. An ANOVA was conducted with interaction and the positive learner style means. The participants were distributed in the positive learner style category in the following breakdown: low (N = 3), moderate (N = 17), and high (N = 104). The results showed a significant difference when it came to the positive learner styles and three levels of interaction [F (2,121) = 3.118, p = .048]. A closer analysis of these comparisons using post hoc tests showed the significant difference (p = .042) was found between the high interaction group and the low interaction group. These results supported the outcome of the t-tests that reported a difference between high and low interactors and positive learner characteristics. The post hoc results were not conclusive

but they may be evidence for future study in this area. Therefore those who rated highly on the positive learner style scale are also likely to rate highly on the interaction scale.

An ANOVA was also conducted with interaction and the negative learner style means. The participants were distributed in the negative learner style category in the following breakdown: low (N = 48), moderate (N = 67), and high (N = 9). The results showed no significant difference when it came to the three levels of interaction and negative learning styles [F (2,121) = .220, p =. 803]. There was no observable difference between interaction groups when it came to the negative learner characteristics. The negative learner style scale had no observable impact on interaction.

T-tests were also conducted to compare mean scores of positive and negative learner styles and interaction. The participants were broken into two groups: high interactors (N = 47) and low interactors (N = 77). The results on the positive learner style mean show that there was a difference between those classified as high and low interactors [t (122) = -2.85, $p < .01$].

The results on the negative learner style mean show that there was no significant difference between those classified as high and low interactors [t (122) = .372, $p > .05$].

Grouped learner style means were also tested for correlation with the interaction subscales. The positive grouped learner style result showed weak, positive relationships with high significance. The negative grouped learner style result showed weak relationships.

Table 79: Correlation of Interaction Subscales and Collapsed Learner Style Scales

Scale	PosLS	NegLS	Instructor	Other
Positive learner style	–			
Negative learner style	.173	–		
Instructor interaction	.110	.179*	–	
Other learner interaction	.252**	-.015	.673**	–
Content interaction	.230*	.103	.456**	.614**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Conclusion for research question one

What do the results say about Research Question One and the comparison of interaction and specific learning styles? The analysis showed that the learning styles that impact interaction are Participation and Collaboration. When groups of high and low interactors are compared, significant differences exist in these two learning styles. Collaboration and Participation were also the most important factors on the analysis of variance and this was supported by the results of the t-tests. A comparative analysis of interaction subscales and learner styles shows similar support for Collaboration and Participation learner styles. An analysis of combined scores of Positive learner styles and Negative learner styles shows that there is some correlation with the positive scale with other learners and content but no significant outcomes with the negative scale. Both Collaboration and Participation are part of the positive learner style scale. Collectively Collaboration and Participation have an impact on interaction. The participants who have strong ratings on Collaboration and Participation learner styles reported higher levels of overall interaction. This group of learners was more likely to be found in the positive learner style scale. If they rated high on the Collaborative learner style, they were likely to have high interaction with their instructor and with other learners. If they rated high

on the Participant learner style, they were likely to have high interaction with their instructor and with course content.

Research question two

What is the relationship between course content and specific types of online interaction?

Course content was represented by the six ways the student may have been asked to use their course material. In this study course content was measured by asking the students to report on the frequency that they used course material in each of the six ways.

Analysis for this question began with correlations comparing overall interaction and course content.

Table 80: Correlation with Interaction and Course Content

Course Content	Interaction Type			
	Instructor	Other learner	Content	Overall Interaction
Memorize	-.038	.062	.048	.044
Demonstrate	.197*	.229*	.218*	.243**
Apply	.248**	.220*	.097	.213*
Analyze	.079	.157	.161	.163
Combine	.107	.066	.066	.128
Recommend	.076	.003	.022	.033

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

All but course content that required Memorization correlated positively but only slightly with overall interaction. The strongest connections were between interaction and Demonstration, and interaction and Application.

The six types of course content were compared to the three interaction subscales. The results of this comparison show little significance and a weak correlation in all types of course content except for Demonstration and Application of course content where the correlation was low but the significance was high.

To further investigate this question the participants were grouped into high interactors, moderate interactors, or low interactors. These groups were compared to analyze the differences between interaction and course content. An analysis of variance with the participants for interaction groups based on their interaction scores showed that Demonstrate, Apply, and Analyze were significant.

Table 81: ANOVA with Interaction and Course Content

Within groups	df	Mean Square	F	p
Memorize	122	.459	1.064	.348
Demonstrate	122	2.753	6.817**	.002
Apply	122	2.270	3.922**	.022
Analyze	123	1.567	3.489**	.034
Combine	120	1.089	1.314	.273
Recommend	121	1.253	2.179	.118

Between groups			p
Demonstrate	low interaction	high interaction	.002
	high interaction	moderate interaction	.020
Apply	low interaction	high interaction	.019
Analyze	low interaction	high interaction	027

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Conclusion for research question two

What do the results suggest about Research Question Two and the relationship between course content and interaction? The results support the finding that Demonstrate, Apply, and Analyze course content methods are related to interaction. A weak but highly significant correlation between overall interaction and Demonstration was observed. Application had a weak but significant connection to overall interaction. When broken down into individual interaction scales, Application had a low but highly significant correlation with instructor and other learner interaction. Demonstrate had low

significance with all three interaction subscales. Demonstrate, Apply, and Analyze are all highly significant when it comes to the differences between high and low interaction means. Those who reported being higher interactors would be more likely to be Demonstrating, Applying, or Analyzing. This means that those who reported that they often were demonstrating their knowledge of their course work, applying what they had learned, and analyzing information based on the skills they learned or knowledge that they had acquired also reported high levels of interaction. When creating online courses demonstrating is used as a major way of having students illustrate proficiency with their course work or is a skill used to understand what they are learning. This may warrant future study in that it may be used too often or it may only benefit those who are high interactors at the expense of those students who are just as capable but do not have high levels of interaction.

Research question three

What is the relationship between online interaction and student satisfaction?

The analysis for this question began with calculation of inter-item correlations using Pearson's Correlation Index. This was followed by *t*-tests to compare the group means. The means of the responses that reflected how the participants felt about their online experience were compared to the different responses of participant interaction.

The results show that a low and highly significant correlation (.282, $p < .01$) exists between overall interaction and overall satisfaction participants had with their courses.

When satisfaction was compared to the three levels of interaction separately, low and highly significant correlations were recorded.

Table 82: Correlation of Interaction Subscales and Overall Satisfaction

Interaction	Satisfaction
Instructor	.272**
Other Learners	.287**
Content	.320**

** Correlation is significant at the 0.01 level (2-tailed).

A t-test with high and low interaction compared to overall satisfaction was conducted. The results show no significant difference between the two group means [$t(122) = -1.779$, $p > .05$].

Conclusion for research question three

What does this tell us about Research Question Three and the relationship between interaction and satisfaction? The main finding in this section was that in this study participants with all levels of interaction could be satisfied with their online courses. The results showed that overall interaction had a small impact on satisfaction. The interaction subscales showed some correlation and significance with satisfaction. Ultimately, there were no significant differences of satisfaction between low and high interaction groupings of participants.

Research question four

What is the relationship between learner styles, course content, interaction, and student outcomes?

The analysis for this question began with descriptive data. Participant grades were collapsed into three categories: high, moderate, and low. The grouping of participants based on grades allowed for the creation of three groups that were then compared. The collapsing of grades impacted only one participant whose results were the lone results in

the lowest category. Each of the three independent variables was compared to the grades participants received in their online courses.

Students who scored high on the Independent learning style reported significantly higher grades for their courses.

Table 83: ANOVA Learning Styles and Marks

	Mean	SD	df	F	p.
Independent	2.8142	.45412	110	3.398(*)	.037
Avoidant	1.3274	.52513	110	1.701	.187
Collaborative	2.5398	.72006	110	0.199	.820
Dependent	2.5575	.64001	110	1.091	.340
Competitive	1.3268	.56792	110	0.041	.960
Participant	2.7699	.51770	110	0.959	.387

* Correlation is significant at the 0.05 level (2-tailed).

A comparison of positive and negative learning styles and grades using analysis of variance showed no significant outcomes. Grades were broken down into low (65 – 74, $N = 16$), moderate (75 – 84, $N = 45$), high (85 or higher, $N = 52$). The analysis of the positive learner style scale showed no significant difference between the three categories of marks [F (2,110) = .288, $p > .05$]. The analysis of the negative learner style scale also showed no significant difference between the three categories of grades [F (2,110) = .557, $p > .05$].

Participant use of course content was also compared to grades to investigate the relationship between the two variables. An analysis of variance was conducted to determine if any differences between the groups existed. Comparison of course content means and marks showed no difference was observed in the comparison of course content of any type and marks. The results of this section showed no significant relationship between the type of content in the course and the final grades.

Table 84: Comparison of Grades and Course Content

Content	Mean	SD	df	F	p
Memorize	2.48	.629	109	.249	.780
Demonstrate	4.39	.649	109	.454	.637
Apply	4.06	.714	109	1.233	.296
Analyze	4.10	.654	110	1.893	.155
Combine	3.88	.885	107	.456	.635
Recommend	4.08	.689	108	.010	.990

Grades were compared between groups split on the basis of high or low interaction. Participants were grouped into two different sets of interaction and were compared to the reported grades. Most high interacting participants achieved high grades but high results were not restricted to high interaction participants.

In the first grouping two interaction categories were used high (N = 45) and low (N = 68).

Table 85: Marks and Interaction (two categories)

	Interaction	
Mark Range	Low	High
65 – 74	9	7
75 – 84	30	15
85 or higher	29	23
Total	68	45

Grades were also compared for three different types of interaction. An ANOVA was used to compare grades for each interaction subscale. The participants were assigned to three categories based on their reported grades: low (65 – 74, N = 16), moderate (75 – 84, N = 45), and high (85 or higher, N = 52).

Table 86: Comparison of Subscales to Marks

	df	Mean Square	F	p.
Instructor interaction	2	.140	.478	.621
Other learner interaction	2	.562	1.199	.305
Content interaction	2	.316	1.027	.362
Overall interaction	2	.238	.328	.721

There were no significant differences between marks achieved by participants reporting different levels of overall satisfaction [F (2, 110) = .133, p = .875].

Conclusion for research question four

What does this tell us about question 4? Overall results showed that only groups of independent learners had differences when they were compared by grades. This result may mean that they have more control or a stronger skill set so they have the potential to be more successful. The data analysis showed no definite connection between grades and interaction. High interactors received high marks but participants in low and moderate interaction categories also received high grades; not as often but the difference was not significant. An analysis of interaction and outcomes showed that there was no significant difference between groups. There was no evidence that a particular way of working with course content impacted the marks that the sample participants received in their online studies. One conclusion that can be reached from these results is that the variation in outcomes between learners may be related to a combination of other factors not accounted for in this study.

Follow-up interview analysis

The final section of the online survey consisted of a single question that asked participants if they were interested in participating in future research related to the online survey. Almost half (41%) agreed to make themselves available to participate in a follow-up interview to review the results of the online survey.

After completion of the survey analysis, those participants who had volunteered to participate in a follow-up interview received an invitation (see Appendix K). The number of participants (10) chosen was based on total number of responses out of the total number willing to participate. Participants were originally to be chosen based on the criteria that they represented each of the main countries involved, spoke English, and were engaged in an educational graduate program. Other criteria were the number of courses taken, age, gender, high and low satisfaction high and low grades. As the sample of those who agreed to participate in an interview was smaller than the original numbers who were willing to participate, the major determinants were the first three criteria only. It was fortunate that most regions with three or more participants were represented in the follow-up interviews. The breakdown included four participants from Australia, four from Canada, one from Korea and one from the UK.

The purpose of this section is to discuss the results of the survey data in a more detailed way. The results of the survey were studied for possible follow-up questions so that the questions used in the interview would be based on outcomes rather than merely re-asking the survey questions. Those important or significant outcomes that could be

considered interesting or powerful provided a basis for the interview questions. Outcomes related to the research questions and main variables that required more exploration were also chosen. There were also interesting questions that were not completely answered using the survey alone. An important purpose of the questions was to connect the participants to the responses of the online survey. As the results of the interviews were analyzed, more ideas arose to provide the basis for refining or focusing the set of questions. The data from the interviews was transcribed and then analyzed using a saturation-coding model (Miles & Huberman, 1984).

The interviews began with warm-up questions at which time the participants were asked about themselves, where they were employed, and if they were currently taking any courses (online or face-to-face). These general questions were used to encourage the participant to respond and feel comfortable with the interview setting. The survey outcomes were shared with the individuals and they were asked for input about the results. The interview questions were divided into the categories of learner styles, course content, interaction tools, and satisfaction. (A copy of the questions can be found in Appendix M.) After these questions were asked, the participants were presented with the findings for the four research questions and were asked to comment on the results. This process was the modified version of Noonan's (2002) Interpretation Panel approach to getting participant input into research outcomes.

Originally it was believed that 30 minutes of interview time was needed to conduct a full discussion of the results. It turned out that the interviews ranged from 45 minutes to one hour and 30 minutes. The interviews were conducted using Skype, telephone, or in person. The first interview was conducted face to face which allowed a fine-tuning of the questions and made it easier to get the first set of responses as no

technological barriers were present. The results of the interviews are presented in the order in which they were asked.

Learner style

Participants reported that they had formally or informally considered their own learning style before becoming online learners. This prior reflection occurred in a variety of settings such as during their jobs as tutors and teachers working with their own students, or as students working with the concept of learning style. They were all very aware of how their learner style impacted their online learning.

The overall and individual scores on the learner style section of the survey were shared with each participant to show how they rated on the learning styles scale used in this research. All agreed with the outcomes and how the scale personally assessed them. All those interviewed rated highest in the three scales (Independent, Collaborative, Participant) that made up the positive learners scale. During the interviews, they self-identified as both independent and collaborative learners and this result matched up with their scores on the learner style scales. They used terms to describe themselves such as "constructivist learner" or "lone learner". Participants understood how they fit in online. One said, "I am a collaborative person. That's why I like online learning so much." They also rated highly on the Dependent scale that was part of the negative style scale. Interview participants scored low on the Competitive and Avoidant learner styles.

Most participants are or were teachers so they had a good awareness of the concept of learner style. They said that they were used to working with other learners so they understood the importance of learner style. Many recognized that from past experiences they had developed a certain learner style that they described as independent and outgoing. They reported enjoying working with groups in the past so by default they became the organizers in their online courses.

Many needed to print off material to be able to work with it. They knew themselves well as learners and used terms like "hands-on learner", "visual learner", or "concrete learner". They described having had the opportunity to try new ways to learn and that they were encouraged "to be more independent if you choose." This impacted some as they changed their teaching style as a result of being more aware of their own learning style.

Course content

The participants were asked to describe the way they worked with online content. They reported a variety of activities and, for the participants, this variety was important. It was important that courses offered not just using one instructional approach or way of working with content. One participant cautioned: "One instructional strategy is not enough; it is a mistake." Most of the content was constructivist in nature. One participant described the important mix of theory and practical content split into modules this way, "the quality of learning materials, the instructional strategies, and the quality of the instructor is what makes your learning environment. It was important that the course were well-structured." Most were asked to do what would be considered standard or traditional online activities. They used bulletin boards or discussion forums, read information and commented on it or posted their thoughts about what they were reading. The students shared their thoughts and ideas by posting online so they wanted to do a good job in front of others. They worked hard creating high quality postings by researching the content thoroughly. They also spent more time drafting responses or postings. Practical activities included creating web sites, wikis, and blogs. The use of audio and video files helped to create a connection between the learner and their instructors. Generally these activities were seen as positive and that they contributed to their success as online learners. One participant remarked that he "felt challenged by the content."

They reported doing group work as well as individual activities and that gave them a chance to create their own groups and then collectively work through the information.

Facilitating online discussion was another common activity. They researched and created their own topic, then moderated the discussion of that topic with the rest of the students in the course. Their job was to stimulate the discussion and see how long interest and input into the topic would last.

The participants were asked if they believed what they were asked to do made a difference in online courses. They agreed and said that the activities did make a difference because they helped to generate a deeper appreciation of the content. Many found that because of what they learned working with the content, they either adapted or modified their own learner style or they gained a greater appreciation of other learner styles.

Getting used to being an online student involved generating a higher tolerance for the specifics of online courses. The new environment meant working with others and learning to trust others. They also said that developing their writing skills to ensure good communication of ideas was another important skill.

Memorizing course content was not a significant part of anyone's online experience. Everything was available through the learning management systems or on the World Wide Web so the information did not have to be memorized. Most said they "did not expect to have to memorize facts at the graduate level." They reported that they did need to know the basic content to understand the focus of the course or to be able to contribute to course discussions but they were never asked to recall it, only apply it.

Most had a favorite activity or favorite approach to working with their online courses. Some rated preparing for the discussion posts highly as a favorite activity. Many enjoyed discussion forums as it gave them a chance to interact with the other students. It was a chance to get a better understanding of ideas with input from others. One said his favorite way was to teach the content to others. That meant preparing and moderating and discussion after choosing a topic. One said she did not have just one favorite way: "I like everything." Reading the information then reporting on it was a practical application of what was being learned through their assignments. They preferred a holistic approach to

their courses, learning how the information fit in with the bigger world or their own situation. When they made comparisons to their face-to-face courses they reported online learning as being their preferred way to learn.

Most also reported a system for progressing through the modules or classes. The process would involve reviewing the content, reviewing assignments, and then planning time appropriately. Printing off and then reading content was a popular approach. Several reported that they liked to get the content and get away from the computer. One stated that she like to "…go somewhere quiet and go through the readings."

Poor or untrained instructors impacted all aspects of online courses. When learners were promised an online experience and this experience was not delivered, they reported that they were upset and disappointed.

Interaction

Participants were asked if interaction in their online courses was valuable. For those who participated in the interviews it was a highly valued aspect of their online courses. They all reported that it was important and it promoted their understanding of the content. Most preferred different amounts of interaction. The varying levels of interaction were based on who they were as learners. They also enjoyed the ability to interact at different levels depending on how the week was going. If they were too busy to interact they would adjust their input accordingly. This 'interaction flexibility' was important. Some reported that they would have successfully made it through the courses without interaction but it significantly deepened their connection with the content and improved the level of understanding. The more experienced a learner was the less interaction they needed. Others said that they would not have taken online courses if there were an absence of interaction. They were not interested in correspondence courses or independent studies. If there was no interaction it was "a real lost opportunity" because "content only goes so far."

Participants were asked what level of interaction they preferred. Some preferred a variety of interaction based on what was happening in their lives at the time. Others said that the content determined how much interaction they had. If they were more interested they would have more interaction. Some connected their learning style to their amount of preferred interaction and claimed that their outgoing personalities were well suited to high levels of interaction. They enjoyed this opportunity to match their face-to-face personalities with their online experience and reported that they could not get enough of online interaction. Others believed that three hours a week was appropriate and that when it came to using the discussion forum a maximum and a minimum number of postings per week was positively appreciated. Most preferred small group interaction as it made it easier to get to know others and interact with them.

When asked if there was a proper way to interact, some said that they "waited to see how things were going before jumping in." They mentioned strategies such as "needing to know the other learners first" or planning to "temper your comments, keep them positive, read the group" or "establish trust with others". They reported a need for a variety of tools or if possible a blended classroom. The use of discussion forums was highlighted as a good way to interact. Having too many scheduled events was not good. Synchronous tools such as Elluminate and Skype were okay as long as they were not used too often. Even though these tools allowed for real-time interaction between students and instructor, it was important to keep the classes predominantly asynchronous. When synchronous tools are "used too frequently, it negatively impacts the flexibility of the course".

The amount of interaction with instructor was based on both the attitude of the student and the approach of the instructor. They had interaction with instructors but only when they absolutely needed to because they did not want to bother their instructor. When they did have contact, the participants appreciated all the efforts made by their instructors to give 'prompt', 'useful', and 'timely' feedback. Most students realized how busy their instructors were and did not want to trouble them but did not hesitate to get in contact when

they needed help. When they were treated as colleagues or equals, not just students, the interview participants reported being very impressed.

Another reason that they only interacted when necessary with their professors was that often the other students could answer the questions they had. There was no need to go to the instructors. If the question was of benefit for other learners, then they would ask on a discussion board. If the question was specific to a particular learner, then the request would be sent directly to the instructor.

They used a variety of asynchronous and synchronous ways to contact the instructors. For direct contact participants often used e-mail. Many reported good interaction using the discussion boards with instructors. For more private and multi-sensory contact they used Skype for one-to-one interaction with instructor. One said that taking the time to meet personally using Skype "showed the instructor was interested." Those who reported having positive contact either through the course or individual contact felt that the instructor was interested in what they were doing and what they were learning. They mentioned they enjoyed having the opportunity to contact instructors during virtual office hours and some even used the telephone to contact their instructors. Active and involved instructors made an effort to be part of the discussion and provide guidance and moderation when it was needed. The participants looked favorably upon these instructor traits.

The students felt let down by those instructors who did not interact or respond to them. In the courses the participants considered poor on a number of occasions students felt that the instructor did not have a good understanding of the importance of interaction with students. The participants felt that some instructors did not understand how they could use interaction to generate a better understanding of the students' needs and learner styles.

Participants were asked if they had social interactions as well as course related interactions with other students. They said that they could have done more of it but "the others were too focused on getting through the content". Some reported having deliberate community building with the instructor or by the institution. Others had regular face-to-face

contact with classmates that helped to create social connections that extended into online discussions. Group activities provided a better place to create social connections. Smaller groups with more discussion contact naturally led to a higher number of social connections. Some said that they did not have the time to make friends and they have local friends so they did not need any extras.

They were asked if they used e-mail to interact with content. Most said rarely or never. The only time that they used e-mail was while doing group work or when cooperating on a project. They used e-mail to share drafts or send "what you were working on to the assembly person." Sometimes they shared articles that arose from discussions.

Participants were asked if they needed to interact to feel satisfied. There was overwhelming agreement that yes they did. One remarked, "Not sure how you could be a lurker and be satisfied." While another said it "gives you feedback on your ideas. Support for understanding the content and shared understanding." Another said she "tends to be independent but the interaction makes you more involved and you get a better feeling about the content." Others made comments such as "yes or you feel isolated." "I push them to interact" and "adds depth and dimension".

Most reported that they had no difficulty interacting using the technology. Any problems they did have were more "psychological than practical". There was a small learning curve at first. One participant made the observation that "You were a bit nervous or hesitant but the more you know the easier it is." The majority of the courses were set-up to foster student success and the online learning environments were well designed. Students today both young and old have a better understanding of technology. There are always problems but they are often quick to be resolved. The participants pointed out that if nothing too traumatic happens, the students will be accepting. They made comments such as: "If the instructor made the problems not seem like problems, then we did not worry." And they "respected that the instructor gave it a go…we all learned together." A key idea they all promoted was the importance of confidence. "One success with one piece of technology

would give you confidence to try other things." Most of the technology they used was low tech and had been integrated successfully in other courses.

Participants were asked if they were successful in their efforts to interact and most replied "yes". They based this answer on the fact that they got feedback from other classmates, mostly on discussion forums. "People responded to postings and would quote what you had written. This showed what I was saying had an impact." "Yes I was successful because I wanted to keep doing it." "I always got a response."

Those who found the instructor did not foster interaction or completely refused to include interaction, even though it was billed as such, were very disappointed. They let the instructors know about this disappointment. This feedback went to the administrators as well as the instructors of the courses. It was important to them that their instructor knew how to promote interaction in an online course.

Tools

Participants were asked about the specific online tools that they used in their courses. Many reported using discussion boards, WebCT, Blackboard, Skype, podcasts, Elluminate, wiki, MSN, and e-mail. Many said that the tool they enjoyed using the most was the discussion board. They all felt it was an important part of the course and they enjoyed using it even if it was a bit overwhelming at first. They realized how critical online discussion forums are to online learning.

A follow-up question asked about the tools they wish they had used. Many said that at the time they were taking the class they were not aware of the other tools. However, once they had a raised level of awareness, they found technologies and tools that they thought would have improved the experience. Most of what they included were part of the new 'Web 2.0' tools such as wikis, blogs, and e-portfolios. Some did have access to these tools in a limited number of courses or in their final courses. They pointed out that if the other tools had been available previously it would have helped the students. Many, especially those studying in technology-based programs, believed that their tutors and instructors were

making good use of current tools. Others realized that large institutions had a huge investment in certain technologies and it was up to the individual instructors to be creative or bring in the newly developed technologies.

Four of the interviewed participants said that they had courses that did not use a textbook. Those who did not have textbooks used web-based readings or journal articles. One student reported that in one of her classes there was no assigned textbook so she used a textbook from a previous course. Others said that a textbook was a valuable tool. The textbooks that they used were very well chosen and appropriate to the content of the course. Some of the texts had supplemental materials and accompanying web sites and this extra information was highly valued.

The final question of this section asked the students to reflect on whether or not online courses were keeping up with changes in technology and strategies. There was a great variety of responses to this question. Some said, "No they were not", "they are lagging behind" and that most institutions are "just locked into one institutional mode when it comes to the delivery of online course content". Others were not sure what to expect from their institutions when it came to using technology. One participant stated, "As a technophobe, everything seemed advanced." Those who reported experiencing innovation in their courses singled out individual instructors for wanting to try new approaches in their courses. Others said that it is hard to be innovative when students are located around the world and there is such a great range of technologies. Institutions have to utilize a system that works so it is not a matter of being behind but is rather more of an inability to escape the lowest common denominators of technology such as bandwidth or students' skill levels.

Satisfaction

Participants were asked if they were satisfied with their online learning experience. All reported being very satisfied with their online experience. Students enjoyed the chance to share ideas and get feedback from other classmates. They also enjoyed the opportunity to

interact with others from around the world. Some believed that online learning was a more comprehensive experience than face-to-face learning. They were satisfied with the opportunity to know classmates and instructor in a way they could not in a face-to-face course. "My instructors made me feel like I matter."

Course design had an impact on satisfaction. If the course was well laid-out and organized, it leads to high levels of satisfaction. They discussed the impact of a few poor instructors but even so they learned what not to do from these situations. The only time they reported being not satisfied was when there was little interaction with their instructor.

Online learning allowed them the ability to take a course because they were unable to leave their jobs and wanted to be present for their families. That opportunity was greatly appreciated as well.

When asked to comment on the fact that over 30 percent of participants in the research survey reported that they did not enjoy their online experience, most said that they were not surprised with this result. Some believed that based on their experience this was a very accurate percentage of non-participating students. In the courses they took there were always people who were not involved or could not be convinced to be involved. Some reported that non-participating students stated their dismay and disappointment with the online experience. Other participants said that some people just have an aversion to work. A number of interview participants said, "what you put into it is what you get out of it." So that "folks looking for an easy class without any real work would not be satisfied." They also believed that those students who are tactile learners would struggle in an online environment as most of the content was virtual or theoretical not "hands on".

Many said that certain learning styles would not work easily in an online environment. This would be especially true if people were unwilling to adapt or be flexible, they would not enjoy the experience. One participant stated, "You have to take charge of your own learning and make meaning of it, often on your own." There were many new variables that online learners are not used to such as technology and interaction. Another

said, "Online courses are not easy, not easy at all and it often takes more time to do well." While another stated "Some learners might feel isolated and threatened based on their learning style, motivation, or technology skills."

They were asked if the other courses that they took helped them to be more successful online students. The responses to this question were positive. The extra experience made them much more comfortable because they knew what to expect. "The process became second nature." Some reported taking introductory units or having the instructors in their first online courses explain how to be a successful online student. This way they knew what was expected of them. They said that taking successive courses helped to develop a number of important skills. They gained and honed specific skills such as how to contribute to the discussion and how to manage time effectively. The knowledge about online learning also helped with writing skills, written communication, and made learners think more carefully about how to design and deliver discussion forum posts.

The participants reported that there were slight variations in all the courses. These variations kept the experience fresh but the courses always had familiar elements. As they took more courses, participants said that they were able to "focus more on the content and less on the process." It built up their confidence and this improved confidence helped to develop their understanding and make the experience that much richer.

The participants were asked if convenience should be more important than quality in an online course. Everyone agreed that the quality of the online experience was a very important aspect and should never be sacrificed for convenience. As adult learners spending valuable time on courses, the quality had to be good. Quality meant that there had to be "meaning in what they were doing." One participant summed up her thoughts by saying, "The courses need to have quality to be worth anything." Some said that the ability to take a course online without disrupting their lives was a convenience but the quality of the program has to be present for them to be drawn to the learning environment. Those who did

take the courses that they considered poor often learned as much or more because they had to do so much extra work.

When asked if computer skills were beneficial to online learners, everyone agreed that they were. They believed that a learner can get through with basic skills or without fully developed skills but having them makes the experience much easier. According to one participant, a good set of skills "…increases tolerance when faced with frustrating technical problems." Many pondered about the specific skill set that was needed. You need "not just the basic skills but the skills that were specific to learning online." Specific Internet skills they identified were: having a strategy for searching, using e-mail, understanding the particular learning management systems such as Blackboard or WebCT. Building or having confidence was identified as an important skill.

Computer skills also have an impact on courses in other ways. If instructors were spending valuable interaction or course time helping to develop the skills in the learner instead of having the learner work through the course content, this had a negative impact on both the learner and the instructor. It was important to learn from the skills that others brought to the courses. The interviews had many examples of students being motivated to learn new approaches or programs that their classmates were using.

When asked if they rated their computer skills truthfully, many said yes, they had and it was a fair assessment of where they were. When asked about their level of accuracy they mentioned that they tried to be as truthful as possible. Many believed they were not experts and that it was unrealistic to expect someone to be an expert in the area of computer technology. They identified different types of computer skills they may rate higher on such as specific program use or knowledge but they would not rate as high on technical knowledge.

Participants were asked if they ever felt lonely or isolated in their online studies. Only a few felt that way to any great extent. One claimed that he was actually ignored by the instructor and other students. No one responded to his discussion posts and this had a

significant negative impact on how he felt about the course. Another participant enrolled in the wrong course by mistake and was not in the same content area as the other students. She was unable to relate to the discussions that others were having around the content and felt isolated. Others felt lonely at times but this feeling was related to the lack of responses that they received. If they were not familiar with the content or not comfortable, it meant they could not be a part of the discussion and felt left out. They believed that this exclusion was not necessarily on purpose. Instructors were crucial in making students feel welcome. If they were active in the discussion and replied to e-mail, then the students felt included.

Participants were asked if they had any outside supports that were not course related. Many said that they did but it was usually one or two local people that they would get to read a paper for feedback or to help with a specific technology problem. Many said that their spouse was usually their main support and often the spouse or partner had little knowledge of what the student was actually studying. Even so it was helpful to have someone for comfort or to talk to. A few had no support and reported that they consulted only their classmates and instructor when they had problems.

Analysis of research question findings

After the set of prepared questions had been asked, the outcomes of the four research questions were shared with the interview participants. They were asked to comment or give their thoughts about the answers to the questions. Overall, the participants were in agreement with the answers.

Comments on research question number one

When asked to comment on question one, most agreed with the findings. They made comments such as “It makes sense” and “That fits, doesn’t it.” They also said that these two types of learner styles are most appropriate and this result is to be expected. One stated, “If participation and collaborating did not exist, the class would not be as beneficial, especially if that was your main learning style.”

Comments on research question number two

When asked to comment on question two, they agreed with the answer. They said “I agree” and “Not a shock” and “Makes sense.” Some wondered why one particular way of working with course content did not emerge as more prominent over the others. Demonstrating was a big part of using the discussion boards so there was no surprise that it rated highly. They reported positively on the practical application of technology in their courses through building Web pages and applying learning strategies. “Most online students are working so you want to have a way of applying what you are learning.” They enjoyed being “able to bringing back to my own situation” and said “Yes, applying to our situations was highly beneficial.” They stated that online courses should have higher levels of required course activities such as demonstrating, applying, and analysis.

Comments on research question number three

When the findings related to question three were shared, the participants agreed with this result. “Anyone can be satisfied. Their style is what gets them through regardless of their level of interaction.” They said that all students should be able to interact at a different level than the other students. “We should not be so bent on

interacting but let people find a level that they are most comfortable with." One said that those in her courses who posted less "were often very thoughtful" and this allowed her to appreciate these people and their styles more. More than one participant stated "What you put into a course is what you should expect to get out of it." Interaction should fit the course, not be an aspect of the course on its own. "If you need it fine, if not let's be doing what we need to get done." Interaction should be up to the individual learner and their style "depends on the learning style as well."

Comments on research question number four

All agreed that the Independent learning style is important and can make a person more successful in any learning situation. "You need self discipline. There is only you." A common response was that to be a successful online learner "you have to be motivated" and "To actually get through the work you need to work independently." An important issue was that they knew of others who simply lacked the discipline and independence skills to be an online learner. "If the person is motivated, they will do as well as they want." The other two parts of this question (impact of interaction and course content on grades) were dismissed as not significant or relevant. One participant thought interaction might have more impact. A general observation was that grades did not seem to matter to the interview participants.

Conclusion of data analysis section

After all of the data analysis was completed, many observations can be made. There was a sufficient amount of data collected that allowed for the generation of solid

findings. The survey did provide rich data to answer the questions. What was asked in research questions was answered and, in addition, other unanticipated results were discovered. Interviewing the participants helped them to share their insights into the areas that were not directly answered in the survey. The interview results reinforced many outcomes of the survey analysis. Chapter five will summarize and discuss the findings from this data analysis.

CHAPTER FIVE

Summary of the research

The goal of this research was to examine the impact of a number of factors on online students. This section summarizes the outcomes of the research.

Participants

The sample was drawn from two universities that allowed access to a diverse set of participants for the study and a wide range of data based on student experience. Among the participants in this study were twice as many females as males. These findings were consistent with demographic results of other studies into online learning and distance education that show females make up a larger proportion of online learners. Looking at the age of the participants in this study, the highest percentage of participants (33%) was found in the 46-55 range. As most participants were graduate students in a masters program, this outcome was not a surprise. It may also illustrate that 46-55 range learners have more time for study with fewer commitments to family or some may be beginning new careers and online learning is a better fit with their situation. The fewest participants were found in the top and bottom age sections. This result may be partly explained by the fact that younger students are more likely to be enrolled in on-campus university programs. Younger students are often more mobile and are more likely to have the ability to get to the campus. Also, there are fewer young people studying at the graduate level.

Most participants reported previous online experience with many (86%) having taken two or more courses. The high percentage of respondents with two or more courses

supports the validity of their results. The extensive experience with online learning may have been the reason their insights were well developed when answering the questions. Graduate students are also better able to reflect and understand their learning situation and as a majority of the participants were graduate students, they gave more thoughtful answers. Older participants may have an advantage as they may be more patient and more focused.

Most participants (79%) rated their computer skills as above average to strong. This rating was reinforced by the lack of problems when using technology to interact with instructor, other learners, or the content. Those in the 36 – 45 and 46 – 55 age ranges reported the strongest skills. It was initially thought that younger learners might report the strongest skill set. However, age did not play a factor in the use of a particular technology and it did not appear evident that younger or older learners favoured one type of interaction over another. Those who reported high, medium, or low levels of computer skills all received high marks.

Participants were mostly education students as the sample was drawn from two colleges of education. Results showed that some participants were studying in other disciplines but not in significant numbers and often in multi-disciplinary programs in conjunction with colleges of education.

Just over half (57%) of the participants were taking a program that was only offered online which meant that a large percentage of the participants had other options for their studies. This conscious choice to try online learning may explain why so many reported successful experiences. They chose a delivery method where they knew they

would find success. If they did not have the option of face-to-face instruction, it may have meant making the best of a situation by studying online.

A total of 23 countries were represented by the sample with the participants studying primarily in Australia (47%) and Canada (22%) with 31% from other countries. The high number of 'other countries' showed the strong international makeup of the online programs in this research. Of those in the 'other countries' category, all were studying at one of the participating universities. English was reported as the number one first language of the participants and most (90%) received instruction in their first language. This outcome might be significant in that 10% may not be as successful or may not find the experience satisfying if they were not instructed in their first language. The impact on non-English speakers of instruction not being understood due to language barriers may be an area of student support that is being overlooked.

Satisfaction and outcomes

This section represented the major dependent variables used in the analysis of participants in the study. To determine their level of satisfaction, students were asked to rate how they felt about aspects of their online learning experience. The response set for this section was strong with very few missing answers. Many different factors were compared to satisfaction and most participants reported being satisfied. The satisfaction factors were combined to create an overall satisfaction score and when it came to overall satisfaction, many (79%) reported being highly satisfied. They believed that online learning was beneficial, it met their needs, and that they would take online courses in the future. A majority of participants reported that they did enjoy the online experience and had strong positive responses to their level of satisfaction with the other questions about

the experience. A strong connection was observed with overall satisfaction in both interaction with other learners and interaction with content. Those who did well based on grades were also highly satisfied. When gender and satisfaction were compared, the results were generally similar. Where there were differences in the results it was usually the females that felt more satisfied than the males. In the follow-up interviews, participants were asked to discuss the factors that impacted their level of satisfaction. Interview participants said that they enjoyed learning from others and finding out how other organizations and cultures approached the same content.

When asked if the experience was beneficial, most participants (80%) reported being in favour with 55% agreeing strongly that it was beneficial. It can be difficult to connect with online students with little or no direct contact, so this result may partially be a testament to the design and delivery of the courses involved in the study. That 14% reported that the experience was not beneficial may be a concern. This result is certainly understandable as it is rare that all students in a course are going to be completely satisfied.

Most participants agreed that they enjoyed their online experience (61%) but more than 30% reported that they disagreed or disagreed strongly and did not enjoy the online experience. This result showed that the online experience could have been more satisfactory for some. In the interviews, participants were specifically asked about this outcome. They believed this 60% - 30% split to be an accurate breakdown of enjoying and not enjoying. This result may be telling us that even though some participants did not feel completely happy with the experience, it served a number of important purposes for them. The discrepancy between responses about finding online learning beneficial and

enjoying online learning may indicate that some learners were able to determine what was important for them even if they did not always enjoy it. Of the 30% not enjoying, it may be attributed to their learner style not matching with the online environment. It is important to let people know what is expected of them and allow them to judge whether or not it fits their style. Those interviewed had a good understanding of the type of learner they were and were able to judge accordingly. Learners do not always have to enjoy the courses to be successful and often it is the fact that the courses lead to a degree with an impact on employment or other opportunities that is the primary motivation for enrollment. In many cases, more education is a means to an end and in any classroom it is not always possible to have complete agreement.

Most (81%) participants reported that they would take online courses in the future. For some participants this means even though they did not enjoy the experience they would take an online course again. It may also suggest that the experience might not be the negative event that they reported in other questions in the survey. Courses are usually part of a program that the participants would be attempting to complete. Some interview participants reported being so impressed by their initial online experience that they were drawn to more online learning. They found the convenience of online learning to their liking or it was a good fit with their current situation.

A high number of participants (81%) said that online learning met their needs. Usually students' basic needs include achieving a passing grade and acquiring an understanding of the content so this high score would be accurate. Interview results also showed that a major need was the flexibility to study while balancing professional and family life.

Of the small number of participants who raised objections to aspects of satisfaction, the issues they reported were: a lack of flexibility, not dynamic, or not taking advantage of possibilities with new advances in technology. They also did not enjoy courses where there were significant amounts of synchronous course time as this made the commitment required for the course too great. It is possible that these comments may have come from the 30% who did not enjoy the experience. Ultimately the success of a course depended on who was teaching and how the course was structured. Having a quality learning experience gave participants the opportunity to learn, develop skills, and interact with a variety of students and their instructor.

Input from participants showed a desire to have some face-to-face experience integrated into their online courses. During the interviews, students wondered about the possibility of using blended classes to increase effectiveness. This might have been in the form of a regular gathering, if students were near one another, or contact using VOIP technologies such as Skype or Elluminate to actually see and hear the other learners. They based these comments on their knowledge of their own learning styles and experience from previous successful courses, both online and face-to-face. These issues are valid and need to be addressed in the planning and delivery of online courses.

The grades showed that students did well in their online courses, which would be typical of graduate level studies. All participants reported achieving a passing grade in their courses and a large number of participants reported marks in the high achievement category of 85 or greater. Only one participant reported a grade in the lowest category. This individual was not a first time student but reported being in the 2 – 5 course completion category. The breakdown of grades between genders showed that in this

sample there was little or no difference between males and females. Older learners and those who had taken multiple courses both reported receiving higher grades. These two outcomes may demonstrate that with more experience learners are better able to understand the process, to concentrate on learning, and to achieve success.

Those who reported high scores on the positive learner style also had high levels of satisfaction. The highest sub-scale satisfaction was found with the interaction with content and interaction with other learners.

Course content

This scale analyzed the course content use reported by students. It was intended to investigate the variety and frequencies of work with course content. The high response scores on most of the scales tell us that participants were working with course content in a variety of ways. The highest reported responses were found in the Demonstrating category but four of the other course content types had high usage.

The overall results showed that a variety of content use strategies were employed in the online courses experienced by students in this research. From the interviews it was learned that there were different types of content used on assignments as well as for general course use. This suggests that instructors and designers saw value in using a variety of methods. Of the six types of course content, only the use of memorizing was low. Almost no (5%) participants reported being asked to memorize information. This was in keeping with what would be expected in graduate studies, which was the level at which most of these students were studying. Retention of basic information in a subject area was necessary but not considered to be learned for recall purposes only. Students were asked to acquire knowledge, build on it, and then apply it. Memorizing course

content had negative correlations with all course content types but Recommend. All other ways of working with content had much higher positive responses. This showed a positive variety of choices made by the instructors of the online courses.

Specific ways of working with course content included a variety of activities such as: reading articles, adding thoughts to forums, and leading groups for discussions. Practical application of what they were studying included group work, wiki development, and website creation. They were also asked to report on how they were integrating their studies into their personal, teaching, or work situations.

Demonstrate had the narrowest range with every participant reporting that they had used it. Breaking down the outcomes further showed that 90% reported being asked to Demonstrate often, likely in the form of a paper, web-based project or discussion forum posting. Almost all (99%) were asked to Apply course content at some level of intensity. Only one participant reported never Applying content. Many of the participants reported often being asked to Analyze information. This section had a narrow range of responses with only two participants reporting never having had to use content in this manner. It is hard to separate these three course content approaches as they would all be used in conjunction with one another during most of the processes students were asked to follow in their assignments.

Combining information was ranked by Bloom's list as the second highest level of course content but it did not receive high scores from the participants. This may be due to the fact that the research participants did not realize that they were constantly combining three of the different course content types. Eighty-one % of participants reported that they used Recommend (the highest on Bloom's list in terms of sophistication) as an activity in

their courses. The higher usage in this last category may be due to extending the assignments to look for ways to use them in a variety of situations or make informed comment. It was not clear specifically who or what the Recommending involved.

Participants were asked which tools they used in their online courses. A majority reported use of discussion boards, e-mail, and all participants used a form of course delivery system or online learning tool. The inclusion of other tools like Skype and wikis showed both a variety and a lack of standardization in online delivery. This variety was a positive aspect much like the implementation of five of the six types of course content and demonstrated a mix of traditional and new online learning technologies. What was very clear was that few used Power Point; even fewer used chat, video, and audio. The interviews highlighted that most institutions have a significant investment in certain technologies. Students in the satisfaction section identified this entrenched use of specific learning management systems as a negative aspect as it limited the online teaching options for their instructors.

Both instructors and students were the catalysts for implementation of new tools in online courses. Students enjoyed learning about new technologies and trying cutting-edge approaches to learning. This result is understandable in that technology-focused programs would be more innovative and use a variety of technologies in delivery and assignments. Often specific tools were related to specific assignments that gave both incentive and meaning to learning the new computer applications.

Although there was a range of differences in the wording, responses supported the results that most of the participants were enrolled in programs that were described using the terms ‘technology’, ‘communications’, ‘online teaching’, ‘learning’, ‘teaching’, ‘flexible learning’. The analysis of the specific programs based on an institution calendar title

showed a breakdown into various categories of programs. The results from this question provided a further breakdown of type of course material with which the participants were involved.

Interaction

The next section examined ways online students were interacting in their online courses with their instructor, with other online learners, and with course content. Interacting with instructors focused on how participants worked with those in charge of their courses. Interacting with other learners looked at the social and academic interactions with those in their courses. Interacting with content focused on how they accessed and used course material in their online learning.

There was a fairly even split between participants when a high, moderate, and low scale for overall interaction was used. The highest number was the segment of the sample that classified themselves as high interactors at 38% just slightly ahead of low at 36%. When the overall interaction was based on only high or low, the results were more heavily weighted to the low interactors at 62%. Overall interaction was valued by most, but 13% did not believe that interacting was important.

When asked about interaction, interview participants believed that it was a valuable and necessary component of the process. They happily interacted using whatever technology was available and reported being successful at doing it, especially when they had good responses from other learners. They believed that they could be successful without it but what interaction brought to the experience was valuable. When asked in the interviews about social interaction, most said they had some social interaction but the majority of the interaction was focused on the course content.

Therefore social interaction did not have as significant an impact on the participants' experience as first believed.

Each of the interaction subscales was studied individually. Participants were asked first about interaction with their instructor. When asked to rate their frequency of interaction with their instructor, four out of five rated themselves low. Seventy-eight % reporting having contact of less than an hour per week. By including two hours of contact or less per week, the number increased to 96%. This interaction result made sense with the asynchronous nature of reported contact. The average time commitment for a course would be around three hours per week so interview participants pointed out that a week's interaction "can't all be with the instructor." Often all that was needed from the instructor was direction or an answer to a question. This type of interaction would not take long but would be valuable to the student. Participants believed that interaction was important but they did not have a high frequency of interaction with their instructor. They would have had more contact with the instructor but were respectful of their instructor's time. This outcome showed that even in an independent or classroom free environment it was important to have an individual to serve as an instructional leader to guide students in their learning.

Most reported that they used e-mail and discussion forums to interact with their instructor. Other means of interaction such as chat (never), videoconferencing (never), and VOIP (rarely) were used with the instructor. Those who did use Skype found it very useful and that it helped them to connect to their instructor. It is important that instructors are made aware of the importance that their involvement and interaction has, even on a limited basis, on student success.

Participants reported a more evenly distributed pattern of contact with other learners as compared to interaction with their instructor. The frequency of interaction was divided into three groups of around a third for each of less than one hour, 1 – 2 hours, and 3 – 5 hours. This showed a much more even distribution than the interaction with instructor and overall more time spent with other learners. Examining the results further showed over half participants reported 1 – 5 hours of interaction per week. This increased interaction may be due to helping one another with studying or taking the time to thoroughly work with other students on a problem. It may also be influenced by the way online courses were structured, often having the students taking turns serving as moderators for the other members of the class. A majority of participants agreed that learner-to-learner contact was important (66%). Interview participants reported enjoying interaction with other learners and that they had regular contact with others in their courses mostly through discussion forums. This contact was regular and expected but not as frequent as involvement with course content.

As with interaction with instructor, videoconferencing, VOIP, and chat were not used extensively. The participants reported some use of e-mail (41% used e-mail to interact with other students) between students in large groups but they mainly used discussion boards to interact with other learners. This tool allowed for asynchronous interaction that works effectively for students in a variety of learning situations. As discussion boards are similar to e-mail it is not surprising e-mail usage was lower. In the interviews participants reported that e-mail was used mostly for specific non-regular contact or sharing of resources. Initially it was thought that use of e-mail would be higher.

In small group situations where collaboration was important and the number of people involved was smaller, learners tended to use more types of technology. Also there was more reported use of e-mail in smaller groups. A closer examination of contact between learners as compared to interaction with instructor revealed a significant difference when comparing the 3 – 5 hour interaction range between instructor and other learners. There was more than ten times difference in totals with 3.3 % interacting with their instructor and 37% interacting with other learners.

Frequency of interaction with content was high. Participants reported that most of their content interaction was conducted using the World Wide Web (90%) and discussion boards (80%) and these were used to some degree by every participant in the survey. This is not surprising as most online content is delivered using these two methods. E-mail was not used as much at 40%. Participants reported using very little chat to interact with content. One reason that chat was not used much may be explained by the development of Skype and other VOIP technologies. Using these programs with the video and audio components adds much more to the interaction. Wikis were used as an alternative method of collaboration with content.

Participants were not asked how many hours a week they interacted with the content or if they believed interaction with content was important. This was because each learner would have differing amounts of contact based on learner style, approach to using content and available time.

Data showed that participants reported using what might be considered basic tools of online study, but with a varying degree of frequency. When asked about interacting using discussion boards with content, participants reported 100%, with other students

78%, and with their instructor 69%. They did not extensively use other technologies such as videoconferencing, audio conferencing or chat but some reported the use of newer tools such as Skype and Elluminate. These newer tools are used by the general population but have not been as quickly adopted by large institutions or into existing courses. There is pressure to start using these tools as students are using them in situations outside of their formal learning and may want to apply this knowledge or skill set to their studies.

Technology is slowly making its way into the courses and the interviews support this belief. Participants believed that more freedom is needed in online course design to fit appropriate tools to learning situations or specific content. Established courses or programs are less likely to make a quick switch to new technologies until the technologies are proven and this belief may explain the large number of missing values in interaction areas such as VOIP and videoconferencing. These tools are not seeing widespread integration yet. It is also unclear what it means when institutions do not use a particular technology. It may be based on pedagogical reasons, financial reasons, or simply a reluctance to respond to change.

In the interview, participants were asked if basic computer skills were important and they agreed that they were. Most rated their computer skills as high and it would be reasonable to expect most people studying online to be confident in using or acquiring the appropriate skills. If the ability to use technology is another key variable in distance education, it was not a significant issue for this group. As most were experienced online students, they may have had problems in their early online experiences but in subsequent activities and courses they reported that they soon knew what to expect. The overall score on lack of difficulty with interaction was high at 91%.

To investigate how technology played a part in their online studies, students were asked if technology had any negative impact on their interaction with their instructor, with other students, or with content. When asked about experiencing problems with technology on the three interaction subscales, a consistent range of 85 – 87 % reported having little or no difficulty. The lowest mean score was reported on the question that focused on any difficulty using technology to interact with other learners. The other two scales were only slightly higher. This difference may be due to the other learners being more motivated or having more opportunity for interaction with other learners than with instructor or content. They might also be working with content once the information had been posted so there was less to go wrong and therefore fewer problems to report. The difficulty of using technology to interact in the three different ways was also correlated with the students' rating of their computer abilities. This result shows a negative relationship that is consistent with the responses that rated most of the participants in the top category of skill level.

A strong relationship also existed between the items that asked if participants had difficulty using technology to access their instructor, other learners, or the course content. The results showed that the participants had little difficulty. Also the types of technology used were fairly basic so the outcome of few problems could be expected. If participants had a higher usage of newer unproven technologies, the amount of difficulty may have been greater. Interview participants stressed that there were always going to be problems with technology. If these problems were fixed quickly or if instructor was up front and let people know that they were experimenting, then students were more flexible and accepting.

There was a variety of written responses when students ran into problems. No one thing stands out as an issue. Most of what was reported was specific to an individual or was an isolated case.

Learning style scales

This section was used to identify the learner styles of participants in the study and it generated a good overview of the population. The participants scored high on the scales believed to contribute to being a successful online learner. The outcomes of the overall learning style scale shows that participants see themselves as strong in Independent (3.8), Participant (3.7), Collaborative (3.6), and Dependent (3.48). Participants were less inclined to rate themselves as Avoidant (2.4) or Competitive (2.24)

The Dependent learner style had a higher score than originally anticipated. This statistic may mean that the Dependent learner style may not be the negative trait it was originally believed to be. When asked about this in their interview, participants did not view being Dependent as a negative trait. Exhibiting a Dependent learner style was regarded as a concept of working with and relying on the input of others for feedback and to complete group projects. Future research in this area may use the groupings into positive and negative learner styles differently.

Looking at activities and the general nature of online learning, it is easy to see how four of the learner styles contributed. The positive learner style score may change by including the Dependent learner style but it may give a better indication of a student's rating on the traits that contribute to their success online. Those who reported the highest grades were also high in the Positive learner style category.

Application of findings to the research questions

When the analysis was completed, the results were used to answer the research questions. The responses were broken down into the following sections:

Research question 1

What is the relationship between learning styles and amount of interaction reported by students?

Those who rated highly on Participant or Collaborative learning styles are more likely to report high levels of overall interaction. Instructor interaction had the strongest positive correlation with Participant learner style and a high degree of significance. A negative correlation was observed between instructor interaction and Dependent learner style. At first it seemed strange that this relationship would be negative. It may mean those who interact may not always do so out of need *of* help but need *to* help. From the interview data we can also conclude that Dependent learner styles also refer to dependence on other learners, not just the instructor. This type of Dependence is not a negative issue. It represents the existence of online community that often is the main form of support and the basis of interaction for online students.

Interaction with other learners had strong correlation and high significance with Collaborative learner style. This may be obvious as you need something to collaborate on other than course content or course materials. A weak and negative correlation with the Avoidant learner style was the only other finding of significance from this set of comparisons. This makes sense as participants likely do not want to avoid interaction with others if they want to be successful in their courses. Interaction with content had no

connections other than a weak and significant connection to the Independent learner style.

Further analysis of this question compared the means from the two groupings of learning styles. This comparison was based on the two groupings of three characteristics that contributed in either a positive or negative way to a learners' ability to be successful. Participants who were categorized as high or low on the learner styles were then compared on interaction scales. Those who rated high on Positive learner style showed a connection with overall interaction, learner-to-learner interaction, and course content interaction. Both Collaborating and Participating were included in this Positive learner style grouping. This shows us that learners who can identify with a Positive learner style are more likely to have a more successful online learning experience. It may also show learners that these are the traits that they need to develop in themselves if they wish to interact more successfully. Diaz and Cartnal (1999) used the GRSLSS and also determined that students who were more Collaborative in their learning style also were more Participatory and Dependent in their approach to learning.

Those who rated high on Negative learner style did not display any connection to overall interaction or the interaction subscales.

Research question 2

What is the relationship between course content and specific types of online interaction?

All course content types involved interaction with content, other learners, and instructors. The course content types that had the greatest impact on interaction were: Demonstrate, Analyze, and Application. The main online activities: reading, posting,

and replying were represented by these three approaches to content. Most often what the students were asked to do was a combination of these three types of course content approaches. Interview participants concluded that regardless of what they were being asked to do, interaction was necessary to completely carry out the activity or to deepen its meaning. They also believed that it was not really possible to be a completely passive online student.

The strength of the correlation between the types of content and how the students interacted with instructors, learners, and content showed similar connections as the three types of course content that impacted overall interaction. Those who were Demonstrating were interacting primarily with other learners and content. Those Applying were interacting mostly with the instructor and other learners. When it came to Analysis, it was also during interaction with the instructor and other learners.

Research question 3

What is the relationship between online interaction and satisfaction with the learning experience?

The online satisfaction scale was created to generate an overall rating of how the research participants felt about their online experience. The study shows that those who had high levels of interaction also had a high degree of satisfaction, but the results were similar for moderate and low interactors. There was no significant difference between various types of interactors and ultimately this means there was no significant connection between interaction and satisfaction. There was some difference in overall interaction, but this was minimal with higher interactors slightly more satisfied. When the results were separated into the three sub-scales, the results showed no difference.

Interview participants believed that there should be less pressure to force students to interact. They supported interaction and found it useful but they reported that "you get out of it what you put into it" and that learners can find satisfaction with their own level of interaction. These outcomes suggest that students should have more input into the creation of the environment so they can interact at the level of their choice. Instead of structuring everything, it was suggested that students be given a choice. Using an approach (referred to as Web 2.0 by Downes) that allows the students the opportunity for input on course design and content creation can accommodate the students' needs and increase their involvement in developing the content of the course. Balancing the need for more student involvement is the observation that learners enjoy and value the contact with instructors so online courses cannot be totally student-run enterprises.

Research question 4

What is the relationship between learning styles, course content, interaction, and student outcomes?

The three variables studied do not significantly contribute to differences in students' outcomes. To a large extent grades are not influenced by the variables of online learning used in this research.

Not many of these variables impacted student outcomes. An examination of learner styles showed that those who rated high on the Independent learner style had high grades. This is to be expected, as individuals with this trait would likely be successful in any learning setting. No other learner style had a significant impact on outcomes. The six different ways of working with course content had no significant impact on student grades. This result refers only to the course activities. Regardless of

what the participants were asked to do, the important fact was that they did it well. It is important to point out that this is different than evaluating how the instructor would teach using these methods. It is also does not suggest that what the instructor did had no impact on the success of the students. Quite the opposite was learned from the interviews in that the role of the instructor was crucial to student success. The role of the instructor was important and had as much or more influence on the satisfaction and outcomes as any of the other variables in the study.

When interaction was compared to grades, the outcomes were similar to the results with satisfaction in that those who interacted at their own level could get high grades.

Major research question

Do learning styles, interaction, and course content impact satisfaction and outcomes of online learners?

The answer to this question is yes, but it is apparent that some factors have a greater impact on the outcomes for online students. These factors work both together and independently to shape the experiences of online learners.

An Independent learning style was a helpful trait to possess and lead to achieving online success. This was the only learning style that had a significant impact on outcomes for research participants. This outcome was similar to the findings of Frey, Faul and Yakelov (2003) where learning styles had very limited impact on the outcomes for the students. Working in a way that matched their own learning style was most important for the satisfaction of participants. The overall level of interaction alone did not have a significant impact on satisfaction. The separate components of interaction also had little

impact on satisfaction. Interaction was important but it was the level of interaction chosen by the student–not by the instructor–that was most satisfying for the participants. This finding is also part of research by Frey, Faul and Yakelov (2003) where learners reported that they wanted a choice when it came to how much interaction they had. More interaction meant opportunities to learn from others and sharing ideas which participants found satisfying but too much interaction may have a negative impact on satisfaction. High grades were attainable for all types of interactors so other factors of online study must be compared to grades. The ability to Demonstrate, Analyze and Apply course content was of benefit to research participants especially when it comes to interacting online. There were types of activities that participants enjoyed and did not enjoy but they still completed them.

Limitations and Future Research

During the research process few major obstacles were encountered. Utilizing a survey was effective as no participants reported technical issues upon completing it. The interviews were useful as they provided an opportunity to talk about the survey results as well as the design and delivery of the online survey. Reporting the survey findings to participants helped the investigator in his understanding of the outcomes of the study. When sharing the data and the outcomes, it is important to thoroughly understand the information it to be able to discuss and learn from it. It is often most effective to work directly with participants when incorporating interviews into research but during this research it was not possible. Use of the VOIP tool Skype allowed access to interview participants that would otherwise have been too costly or inconvenient to involve in the research.

The missing data in the Learner Styles Section was not an issue as it was addressed by having ten items contributing to each of the six characteristics. Therefore if any question had to be eliminated due to missing data there were a sufficient number of responses to contribute to the outcome of the scale item. The question asking about the grades participants received had 112 responses but of these only 16 were formatted as numbers. Therefore, based on the design of the data analysis, the results reported that there were 108 missing responses. This potential problem was solved by utilizing a conversion scale already in use by one of the participating universities (University of Southern Queensland Calendar, 2006). The grades were recoded based on the course calendars to be used in the analysis. Had the existing scale not been available, a much more subjective recoding of grades would have been applied.

With any project there are many processes that can be conducted better when they are replicated. This research study is no different. The course content section did not provide a comprehensive way of determining what the students were working with in their classes. Additional questions that are more specific are needed to better assess this aspect. It might also be beneficial to look at course content from a different perspective in an attempt to find out more about what the learners were doing. One way to accomplish the perspective shift is by approaching the section as courses activities as opposed to course content.

The next version of this survey instrument might include more open-ended questions at the end of each section to allow for more input into issues not anticipated in the research design. The next version of the survey would not contain questions about specific tools but ask them to describe what they used. It might be also be helpful to ask

if methods or tools of interaction were available for use in the courses instead of just looking at frequencies. These issues arose from the results of the use of chat and videoconferencing from the interaction section. These questions had low response levels but it was not determined if the tools were not available or just not utilized. If they are to be included in future research, it may be possible to investigate these further by including a text entry option on the survey or to specifically ask about the tools with low response levels in the follow-up interviews. Another approach might be to completely eliminate chat and videoconferencing in future research and focus more on VOIP and other emerging technologies. A reduced focus may also apply to the study of online discussion boards as every participant used them and all reported that they found them of benefit.

Future research should investigate how long a class or program has been offered to students or when was it last updated or modified. This may give insight into student satisfaction and the type of technology used. It might be beneficial to investigate if newer or older courses have higher levels of satisfaction. New courses are often not thoroughly tested and have unforeseen issues that can seriously disrupt the learning experience. Alternately, newer courses might bring in cutting edge technologies and strategies that appeal to students. Courses that have been taught for many years may be in need of an update to accommodate changes in technology or content. In future research, it might be advisable to ask about mixed mode programs to determine if the learners are taking a blend of online and face-to-face in their courses.

A significant issue in this research was the narrow range in the sample and the lack of variety in the programs participants were taking. This study focused primarily on education graduate students so it is difficult to generalize beyond this population. This

group likely shared a similar approach to delivery and similar course content in their programs. There would also be a higher number of individuals who were teachers and would share common learner styles or other characteristics. Future research needs to look at sciences, law, fine arts and other content areas for more contrast and variety in the sample. Including a broader range of universities would increase the variety of information used to inform these results. There was no attempt to determine if there were differences between two or more regional or geographic groups involved in this study. Assumptions were made in original study about culture or race and the homogeneity of the participants. There may be the potential to investigate the impact of both culture and race on student satisfaction and outcomes.

A continuation of this research should focus on key outcomes such as learner style and interaction and specifically continue to look at research questions one and three. The outcomes around course content do not appear to be significant in the manner they were studied in this research. Perhaps a different approach to understanding course content would generate better insight. In addition to maintaining the original focus of this study, future researchers may want to ask participants what makes them satisfied with their online courses. An online survey and follow-up interview format should again be used if this research is to be replicated.

Personal reflection

When I compare my experiences with those of the research participants I see a number of similarities and this puts me at ease with my approach to online learning. I have an understanding of the importance of a certain amount of interaction based on who I am as a learner. I took the Grasha-Reichman Learning Style Scale test and rated highly in the area of Independence. I realize how my own strongly Independent learner style is of benefit to me and supports my success. The fact I am completing my degree shows that I am successful as someone who rates high as an independent learner. I am now aware that others also have limited but valuable contact with their instructors and that most of their time is spent with course content. I now realize that some online learners are isolated and that their online learning can sometimes be a lonely experience. The local support system that I used was similar to what other online learners did when support could not be found with other classmates.

If it were possible to have had access to some of the results of my research before I began my program I would have had a better idea of what to expect and may have enjoyed my studies even more than I did. Knowing what I now know gives me a sense of connection with the learners who participated in my study. During the follow-up interviews I found that the interview subjects and I spent time talking about our similar experiences. This allowed me to generate a deeper understanding of the online experience and to share many different ideas, some related to the research some not.

When I reflect on how the research process has impacted me as a learner I would say that I have a better realization of my own learner style. I hope that others find the results as useful as I did while generating them, and whatever the application of these

findings, it is my belief that through this research study into learners' experiences, what we have learned will improve the delivery of online programs. Lastly, if I were to give advice based on doing this research it would be to be aware of who you are as a learner and use this personal awareness to use your strengths and be aware of your weaknesses when it comes to being an online student.

Recommendations

In any educational environment there will be a variety of learners and they will approach the learning situation with a range of experience, skills, and expectations. It is important to ensure that students benefit from technologies and that beneficial online teaching strategies be applied. Post-secondary institutions need to be more flexible and current in their offerings in online learning. They must ensure that conditions exist to support learning and ensure the integration of context-appropriate aspects of the ever-changing world of technology.

As technologies change and students become more skilled in–and more comfortable with–their application, online courses and programs will be able to employ more innovative ways to support teaching and learning. This support should include interactive technologies such as Skype or Elluminate. As the graduate school population becomes more familiar with the newer interaction technologies, they will be better able to handle the changes and expectations of technology-supported online education. Technology skills are important if students are to progress beyond simply getting through the courses. This is directly related to the research of Hillman, Willis and Gunawardena

(1994) that emphasized the importance of how well students deal with learner-interface interaction. A learner's level of technological competency can have a huge impact on their outcomes and satisfaction.

The onus is on institutions to be flexible and to allow faculty to take calculated risks and to be innovative in online environments. There must be a variety of course content or program-based activities that are linked together or that build on one another. Instructors need to be better trained in the areas of fostering interaction, understanding technology, and pushing the limits in the creative application of technology. It is clear that course instructors have a vital role in the successful delivery of an online course and the academic well being of the students. Well-organized instructors who are willing to try new ideas and technologies are the key to a successful online course. When students receive quality feedback, direction, and have a sense that the instructor cares about them, they are able to enjoy the course and feel successful. That being said, there are certain tried and successful methods and applications that already exist. For example, discussion boards are crucial and should be used in all courses in order to facilitate interaction and understanding of course content. It is important to have low numbers of students in online classes or to divide larger classes into small working groups as quality online learning is most effective in small groups in much the same way as in face-to-face settings. A more intimate environment allows for better interaction and a better understanding of content. These beliefs may run counter to institutional pressure to make online learning a money-making proposition that uses economies of scale by promoting larger class sizes. If institutions are made aware of the cost-efficiencies of student-student interaction and

Anderson's (2002) research that believes as long as form of interaction is done well then students can be successful, they may look at online course offerings differently.

Students need basic skills and an awareness of what an online experience might be like. A learner style self-test may be helpful for learners to determine their suitability for online learning. Picciano (2002), and Chen and Caropreso (2004) studied courses where students assessed their learning style but these studies examined the learners after they had completed their studies as opposed to letting learners know their personal learner style before a course began. Having knowledge of learning styles prior to the courses would give students an understanding of what to expect and how a course might or might not fit with who they are as learners. An orientation or a basic online learner skill development session would also be helpful for all new online learners. This would be helpful in showing them not just how to use the technology, but how to work with online discussions and how to self-manage or motivate themselves in this new experience with learning.

It is clear that Moore's (1991) emphasis on reducing the impact of transactional distance is still an issue. Institutions and instructors must ensure that well-developed support systems are put in place. The students would then have somewhere to go for help for both technical and course content-related issues. In this way, a small problem or misunderstanding does not derail the entire experience for one or many students.

It is important not to force interaction on students but to allow them to have a choice in the amount and frequency of interaction. They need interaction that is suited to their life situations and interaction that is specific to their learner style needs. Even with allowances for student determined levels of interaction, there is a need to ensure that

students understand the importance of interacting with content. The results show that interaction with instructors or other learners is not needed as much as compared to the amount of time needed to do readings and postings. Courses should be designed to facilitate social interaction but instructors should not push students into any artificial socializing as many students may not want it. It may be better to let the socializing happen if and when the students want it.

Impact on course design

One of the intended practical results of this research was to inform online course design. A number of key ideas from the preceding section to help make online learning more effective have been summarized.

It is important to provide learner self-assessment in advance of courses using a learner style questionnaire or quiz. The ability for a student to generate a level of self-knowledge before beginning an online learning experience can be very beneficial. It allows them to prepare properly and may assist them in anticipating the parts of the course where they may need help.

Instructors are important. Without carrying committed instructors students will not succeed. Ensuring that those teaching online are made aware of the need to be active and involved with their online students to make the experience the best one possible is crucial. Pre-training sessions with both new and experienced online instructors should be a part of every institutions instructor preparation plan.

Courses need to provide more student choice regarding interaction. It is important to not force interaction on learners or create ‘busy work’ with extra assignments intended to increase interaction.

Online courses should not include a large number of synchronous events. The reason students take online courses is so that they do not have to be at a certain place at a specific time. Students need time to work independently and take advantage of the flexibility that the online environment offers them.

These are some of the specific practical suggestions to come out of this research. All of these points are simple and easy to implement in an online course or program. There may be opposition from course designers to some of the suggestions made but they are suggestions not from the researcher but from the students themselves. I believe that the students have the most to offer us when it comes to evaluating how successful we are at designing and delivering courses and that we should listen very carefully to what they are saying to us.

Conclusion

The outcomes of this study give a better understanding of which factors influence learning for online students. Learning from those involved in receiving online instruction has generated important insights for educational researchers and those in charge of designing and delivering online education. Understanding the impact of technological implementation and integration into teaching is an important objective but the experience of students should be equally as important. When we discover that a particular course works better with a specific pattern of interaction, then we are successfully learning about the workings of online courses. Students working with education courses may find VOIP sessions beneficial to their learning, then we may want to include this form of interaction in other courses with similar content. If students with an Independent learning style prefer methods of interaction that are more student-centered as opposed to working under the direct guidance of an instructor, efforts must be made to encourage the type of course design that facilitates success for Independent learners. Other students may prefer to work with others and every effort should be made to support them as well. The outcomes suggest that a variable such as socializing or chat is not important but that an interaction strategy such as integrating small group projects may be widely incorporated to benefit learners. All of these issues must be revisited and taken into account when we plan and deliver online learning.

It is important for other scholars to continue to further the research presented in this study. The benefits of continuing this research include adding to the amount and quality of research available on this topic as well as challenging the outcomes of this

study. I would encourage my colleagues to find out more about the impact of online interaction and learning styles, as there is still so much about theses issues that we do not know. Finally, all researchers should continue to deepen their understanding of online learning which will ultimately assist all learners in their quest for educational success.

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Appendix A

Request to USQ faculty to participate in survey

Dear

I am contacting you to request your assistance with a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the Faculty of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion. You have been contacted because you have taught online courses at USQ. It is hoped that you will allow me to survey your S1 and/or S2 2006 students as a part of my research. The survey has been authorized by the Dean of Education at USQ and has been approved by USQ Ethics.

If you agree to support this study Dr. Albion will send a contact e-mail to the students giving them access to the online survey. The contact e-mail will explain the survey, why the individuals were chosen, the rights of the participants, and will contain contact information to use if there are any questions. To ensure the anonymity of student information, the survey request e-mail will be sent out by USQ re-mailer. The time requirement for the survey is short (about 15- 20 minutes) and should not greatly inconvenience students. There is no way in this research to connect student input to a specific course. All data collected will be anonymous.

I hope that you will agree to allow me to access your students. If you are satisfied with the conditions of the study, please complete the attached consent form and forward it to Dr. Peter Albion at the Faculty of Education. Please retain a copy for your records. Should you have any questions about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 (Canada) or Dr. Peter Albion at albion@usq.edu.au.

Thank-you for considering this request.

Sincerely, Jay Wilson, EdD Doctoral Candidate, USQ

Appendix B

Request to U of S faculty to participate in survey

Dear

I am contacting you to request your assistance with a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the Faculty of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion. You have been contacted because you have taught online courses at the U of S. It is hoped that you will allow me to survey your S1 and/or S2 2006 students as a part of my research. The survey has been authorized by the Department Head of Curriculum Studies and has been approved by U of S Ethics Committee for Behavioural Studies.

If you agree to support this study Tracey Stephenson will send a contact e-mail to the students giving them access to the online survey. The contact e-mail will explain the survey, why the individuals were chosen, the rights of the participants, and will contain contact information to use if there are any questions. To ensure the anonymity of student information, the survey request e-mail will be sent out using the PAWS system. The time requirement for the survey is short (about 15- 20 minutes) and should not greatly inconvenience students. There is no way in this research to connect student input to a specific course. All data collected will be anonymous.

I hope that you will agree to allow me to access your students. If you are satisfied with the conditions of the study, please complete the attached consent form and forward it to Dr. Peter Albion at the Faculty of Education. Please retain a copy for your records. Should you have any questions about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 (Canada) or Dr. Peter Albion at albion@usq.edu.au.

Thank-you for considering this request.

Sincerely, Jay Wilson, EdD Doctoral Candidate, USQ

Appendix C

Invitation to students to participate in online survey (Australia)

I am contacting you to request your participation in a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the College of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion. You have been selected as a potential participant in this research study because you have taken one or more online courses. I am asking you to complete the survey only once. If you received this e-mail request again you may ignore it.

The study is set up to record the experiences that you have encountered as a student of an online course. The survey consists of five sections of online questions and the entire survey should take you between 15-20 minutes to complete.

The survey is completely anonymous. There is no way to connect you with the responses that you have given. You may refuse to participate knowing that there are no consequences. At any time you may withdraw from the study. This study has been approved on ethical grounds by the University of Southern Queensland. If you have a concern or complaint you can contact Ms. Christine Bartlett at the USQ research office at: bartletc@usq.edu.au. Should you have any questions about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 (Canada) or Dr. Peter Albion at albion@usq.edu.au.

If you choose to participate you may go to the online survey at this web location.
http://edmund.usask.ca/phpsurveyor/index.php?sid=21
(You can click on the link or paste it into your web browser.)

Thank you for your time and consideration of my request.

Jay Wilson

Appendix D

Invitation to students to participate in online survey (Canada)

I am contacting you to request your participation in a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the College of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion. You have been selected as a potential participant in this research study because you have taken one or more online courses. I am asking you to complete the survey only once. If you received this e-mail request again you may ignore it.

The study is set up to record the experiences that you have encountered as a student of an online course. The survey consists of five sections of online questions and the entire survey should take you between 15-20 minutes to complete.

The survey is completely anonymous. There is no way to connect you with the responses that you have given. You may refuse to participate knowing that there are no consequences. At any time you may withdraw from the study. This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board on July 7, 2006. If you have any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services (966-2084). Out of town participants may call collect. Should you have any questions about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 (Canada) or Dr. Peter Albion at albion@usq.edu.au.

If you choose to participate you may go to the online survey at this web location.http://edmund.usask.ca/phpsurveyor/index.php?sid=21
(You can click on the link or paste it into your web browser.)

Thank you for your time and consideration of my request.

Jay Wilson

Appendix E

Follow-up request to participate in research survey

Hello

I am sending this message to thank you for your help in my research. I have received an excellent response so far and I am looking forward to seeing what you have to say about your experiences.

A few messages bounced back to me so I have updated the addresses and I am sending my request again. I apologize for the spam to those of you who have already completed the survey. If you haven't yet completed a survey I have included my original request below and would hope that you could find the time to do so.

Thanks again

Jay Wilson

I am contacting you to request your participation in a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the College of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion. You have been selected as a potential participant in this research study because you have taken one or more online courses. I am asking you to complete the survey only once. If you received this e-mail request again you may ignore it.

The study is set up to record the experiences that you have encountered as a student of an online course. The survey consists of five sections of online questions and the entire survey should take you between 15-20 minutes to complete.

The survey is completely anonymous. There is no way to connect you with the responses that you have given. You may refuse to participate knowing that there are no consequences. At any time you may withdraw from the study. This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Research

Ethics Board on July 7, 2006. If you have any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services (966-2084). Out of town participants may call collect. Should you have any questions about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 (Canada) or Dr. Peter Albion at albion@usq.edu.au.

If you choose to participate you may go to the online survey at this web location.

http://edmund.usask.ca/phpsurveyor/index.php?sid=21
(You can click on the link or paste it into your web browser.)

Thank you for your time and consideration of my request.
Jay Wilson

Appendix F

Content Survey Questions

This section used the scale

1. How often did you memorize information but not have to understand it in your online courses?

2. How often did you demonstrate your understanding of information in your online courses?

3. How often did you apply knowledge or use abstract theories to solve problems in your online courses?

4. How often did you analyze, or classify information in your online courses?

5. How often did you combine information to form a new or unique product in your online courses?

6. How often did you have to make informed decisions or recommendations based on information in your online courses?

7a. Which of the following materials have you used in your online courses? [Text materials]

7b. Which of the following materials have you used in your online courses? [Discussion boards]

7c. Which of the following materials have you used in your online courses? [Power point] 7

7d. Which of the following materials have you used in your online courses? [Chat, Instant Messenger, MSN]

7. Which of the following materials have you used in your online courses? [Course delivery systems such as Web CT, or Blackboard]

7. Which of the following materials have you used in your online courses? [Video files]

7. Which of the following materials have you used in your online courses? [Audiofiles, Podcasts]

7. Which of the following materials have you used in your online courses? [Other]

8. Which general category fits the type of content you work with in your studies?

8. Which general category fits the type of content you work with in your studies? [Other]

9. What is the name of the program you are taking (according to the registration guide)?

Appendix G

Learning Style Instrument

The following is a Grasha-Reichmann Student Learning Style Scales. It has been designed to help you clarify your attitudes and feelings toward the courses you have taken thus far in college. There are no right or wrong answers to each question. However, as you answer each question, form your answers with regard to your general attitudes and feelings towards all of your courses.

Respond to questions below by using the following rating scale.

1) strongly disagree 2) moderately disagree 3) undecided 4) moderately agree

5) strongly agree

1. I prefer to work by myself on assignments in my courses.
2. I often daydream during class.
3. Working with other students on class activities is something I enjoy doing.
4. I want teachers to state exactly what they expect from students.
5. To do well, it is necessary to compete with other students for the teacher's attention.
6. I do what is asked of me to learn the content in my classes.
7. My ideas about the content often are as good as those of my instructor.
8. Online activities are usually boring.
9. I enjoy discussing my ideas about course content with other students.
10. I rely on my teachers to tell me what is important for me to learn.
11. It is necessary to compete with other students to get a good grade.
12. Online sessions are typically worth participating in.
13. I study what is important to me and not always what the instructor says is important.
14. I am very seldom excited about my course material.
15. I enjoy hearing what other students think about issues raised in class.

16. I want clear and detailed instructions on how to complete assignments.

17. In class, I must compete with other students to get my ideas across.

18. I get more out of working with my classmates than working alone.

19. I learn a lot of the content in my classes on my own.

20. I attend most of my scheduled online sessions.

21. Students should be encouraged to share more of their ideas with each other.

22. I complete assignments the way my teachers tell me to do them.

23. Students have to be aggressive to do well in courses.

24. It is my responsibility to get as much as I can out of a course.

25. I feel very confident about my ability to learn on my own.

26. Paying attention during online sessions is difficult for me to do.

27. I like to study for tests with other students.

28. Trying to decide what to study or how to do assignments makes me uncomfortable.

29. I like to solve problems or answer questions before anybody else can.

30. I find most online course activities to be interesting.

31. I like to develop my own ideas about course content.

32. I have given up trying to learn anything from participating in class.

33. Online sessions make me feel like part of a team where people help each other learn.

34. Students should be closely supervised by teachers on course projects.

35. To get ahead in class, it is necessary to step on the toes of other students.

36. I try to participate as much as I can in all aspects of a course.

37. I have my own ideas about how classes should be run.

38. I study just hard enough to get by.

39. An important part of taking courses is learning to get along with other people.

40. My notes contain almost everything the teacher covers in class.

41. Being one of the best students in my classes is very important to me.

42. I do all course assignments well whether or not I think they are interesting.

43. If I like a topic, I try to find out more about it on my own.

44. I typically prepare for exams long before I write them.

45. Learning the material was a cooperative effort between students and teachers.

46. I prefer class sessions that are highly organized.

47. To stand out in my classes, I try to complete assignments better than other students.

48. I typically complete course assignments before their deadlines.

49. I prefer to work on class projects and assignments by myself.

50. I would prefer that teachers do not give extra attention to me.

51. I am willing to help other students when they do not understand something.

52. Students should be told exactly what material is to be covered on exams.

53. I would like to know how well other students are doing on exams and course assignments.

54. I complete required assignments as well as those that are optional.

55. When I don't understand something, I first try to figure it out for myself.

56. During online sessions, I tend to socialize with other students.

57. I enjoy participating in small group activities.

58. I want teachers to have outlines or notes available to me.

59. I want my teachers to give me more recognition for the work I do.

60. I am always prepared to participate in my online course sessions.

The results of your learning style survey are as follows:

Independent _____
Avoidant _____
Collaborative _____
Dependent _____
Competitive _____
Participant _____

Appendix H

Interaction Survey Questions

These questions represent examples of what may be asked in the online survey. Each question will have 5-point scale responses. Where appropriate for the particular question the following scales will be used.

Scale A

1) strongly disagree 2) moderately disagree 3) undecided 4) moderately agree

5) strongly agree

Scale B

1) never 2) rarely 3) neutral 4) often 5) frequently

1. How often did you interact with your Instructor in your online courses using the following technologies? [E-mail]

1. How often did you interact with your Instructor in your online courses using the following technologies? [Discussion Board]

1. How often did you interact with your Instructor in your online courses using the following technologies? [Chat]

1. How often did you interact with your Instructor in your online courses using the following technologies? [Videoconference]

1. How often did you interact with your Instructor in your online courses using the following technologies? [VOIP (Voice over IP, Skype, MSN)]

1. How often did you interact with your Instructor in your online courses using the following technologies? [Other]

2. If you selected other in the previous question describe the methods you used.

3. Interacting with my instructor was important to me.

4. On average, how many hours per week did you interact with your instructor?

5. How often did you interact with other learners in your online courses using the following technologies? [E-mail]

5. How often did you interact with other learners in your online courses using the following technologies? [Discussion Board]

5. How often did you interact with other learners in your online courses using the following technologies? [Chat]

5. How often did you interact with other learners in your online courses using the following technologies? [Videoconference]

5. How often did you interact with other learners in your online courses using the following technologies? [VOIP (Voice over IP, Skype, MSN)]

5. How often did you interact with other learners in your online courses using the following technologies? [Other]

6. If you selected other in the previous question describe the methods you used.

7. Interacting with other learners was important to me.

8. On average, how many hours per week did you interact with other learners?

9. How often did you work with content in your online courses using the following technologies? [Webpage]

9. How often did you work with content in your online courses using the following technologies? [E-mail]

9. How often did you work with content in your online courses using the following technologies? [Discussion Board]

9. How often did you work with content in your online courses using the following technologies? [Chat]

9. How often did you work with content in your online courses using the following technologies? [Other]

10. If you selected other in the previous question describe the methods you used.

11. I had difficulty using technology to interact with my instructor.

12. If you answered "Moderately Agree" or "Strongly Agree" to the previous question please explain why.

13. I had difficulty using technology to interact with other learners

14. If you answered "Moderately Agree" or "Strongly Agree" to the previous question please explain why.

15. I had difficulty using technology to interact with course content

16. If you answered "Moderately Agree" or "Strongly Agree" to the previous question please explain why.

Appendix I

Satisfaction Survey Questions

1. I found my experience as an online student beneficial.

2. I enjoyed my experience as an online student.

3. If given the opportunity I would take online courses in the future.

4. What grade did you receive in your online course?

5. Online learning met my needs as a student.

6. If you answered "Moderately Disagree" or "Strongly Disagree" to the previous question please explain what was lacking in your online experience?

Appendix J

Background information

1. What is your gender?

2. How many online courses have you taken?

3. What type of online courses have you taken? You can select all that apply to you.

4. Is your program of study only available online?

5. What is your age?

6. What country are you currently living in?

7. Are your online courses taught in your first language?

8. What is your first language?

9. How would you rate your computer skills?

Appendix K

Letter to Distance Education Participant

(Date)

Participant name

Participant Address

Dear (participant)

I am providing you this letter to request your participation in a research study that will investigate the experiences of students involved in online distance education. The study, which is part of my EdD in the College of Education, University of Southern Queensland, is under the supervision of Dr. Peter Albion.

The study is set up to record the experiences and observations that you encounter as a student of such a course. There are no theories or ideas being tested. Your input will make up most of the data. The study will require one telephone interview with you. The interview will be tape-recorded.

I have also provided a consent form that outlines in more detail the commitment that is required of you as a participant, the benefits and possible inconveniences of participating in the study and your rights as a participant. Should you have any questions of concerns about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 or Dr. Peter Albion at albion@usq.edu.au.

Once you are satisfied with the conditions of the study, please sign two copies of the consent form and return one to me. The other copy is for your records.

Thank-you for considering this request.

Sincerely,

Jay Wilson.

Appendix L

Confirmation of Role - Distance Education Participant

Please read this consent form. Should you have any questions of concerns about the study, please contact me at jay.wilson@usask.ca or 306-966-7617 or Dr. Peter Albion at albion@usq.edu.au.. Once you have read and fully understand the form and if you are in agreement with the contents, please sign and date both copies of the form and return one to me by fax. The other is for your records.

1) Commitment that is required

You will be expected to meet with me once . We will discuss your reactions, experiences and concerns with the delivery of your courses or program. With your permission, these meetings will be audio taped. You will have an opportunity to proofread the transcripts of the interviews, at which time you will be asked to clarify statements and or give more detailed explanations of your comments to ensure that I have correctly and adequately interpreted your intended meanings.

2) Benefits to participants

Opportunity to discuss and share ideas about the class. Opportunity to gain some insight into distance education theory. Opportunity to reflect on learning.

3) Possible inconveniences

The time commitment in interviewing, and responding to audiotape transcripts.

4) Publication of data

It may be necessary to use direct quotes from you in any publications that arise from the research. Nothing will be included in such publications without a signed consent form approving any quotes or transcripts material used.

5) Rights of the participant

Participation is voluntary: you have the right to withdraw from the study at any time, and all data collected will be destroyed

Pseudonyms will be assigned in the final document of the study

Any information that you share will be treated with all possible confidentiality

All data, including audiotapes, audio files, computer files, and interview transcripts, will be kept secure at the University of Southern Queensland, and destroyed five years after the conclusion of the study.

I have read the information outlining Jay Wilson's proposed research, and I am volunteering to be a participant in the study.

Signature_____ Date_____

Appendix M

Interview Questions

Participants were asked the following questions. If responses to the questions were referred to in previous answers those questions were skipped.

Learner Style

Did you ever think about what type of learner you are? What about the categories? Of the six categories did you consider yourself anyone of the labels in particular?

Course Content

How would you describe the way you were asked to work with your online course content?

Did what you were asked to do with the type of course content make a difference in your studies?

Were you asked to memorize course content?

Why or why not? Was this a good thing?

Did you have a favourite way of working with content?

Interaction

Do you believe that interaction was useful in your online course(s) and, if so, in what ways?

What level or amount of interaction did you prefer?

Did you interact with your instructor? If so in what ways.

Were all of your interactions in the class related to coursework? Did you have social interactions as well?

What did you feel was the proper or most successful way to interact with:
Your instructor? Other online students? Course material?

Did you use e-mail with content? If yes, how?

Did you need to interact to feel satisfied with your course?

When it came to using technology to interact most reported no difficulty? Why do you think this is so? Perseverance? Course design? Student skill?

Were you successful in your efforts to interact?

Tools
What online tools did you use. Did you find them effective?

Bulletin boards? Did you like to use them?

What other technologies would you have liked to use.

Did you use a textbook or other course materials?

In your opinion, are online courses keeping up with the changes in technologies or strategies?

Satisfaction
Were you satisfied with your online courses? Why? Why not?

If Yes What made you satisfied?

If No Specifically what made it unenjoyable?

30 percent of the survey participants disagreed that they enjoyed the experience. What is your reaction to this?

Has taking other courses been beneficial to you when taking future courses?
If it has in what ways?

In what ways was the experience beneficial?

Does convenience outweigh quality in an online course?

Do good computer skills help online students? In what ways?

Did you rate yourself truthfully on your level of computer skills?

Did you ever feel lonely or isolated?

What human supports did you have?