EXPERIENCES OF AND PREFERENCES FOR INTERACTIVE INSTRUCTIONAL ACTIVITIES IN ONLINE LEARNING ENVIRONMENT

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Abstract

Given the lack of research on the pedagogical issues of online interactions, this study is conducted to deepen current understanding about student experiences of and preferences for instructional activities that promote learner-instructor, learner-learner, and learner-self interactions in online education. Four overarching research questions were examined in this study: (1) What instructional activities are used to promote online course interactions? (2)What are learner preferences for these instructional activities? (3) Is there a relationship between learner's gender, age, prior educational level, online experience, work status, marital status, or personality and preferences for the instructional activities that promote online class interactions? (4) Why do learners prefer some interactive activities over others?

Using survey analyses from 188 online MBA students and 11 follow-up interviews, the study revealed findings at both the technological and pedagogical levels. For instance, learner preferences toward class-level asynchronous discussion ranked quite low even though it was used often in online learning. Results further revealed that the relatively low preferences toward class-level discussion were related to large class size, repetitive postings, and unclear rules and expectations. In general, online learners prefer to engage in all three types of interactions. The preferences decline in the order of learner-instructor, learner-learner, and learner-self interaction. Age is positively related to learner preferences for learner-self interactions, while raising kids is negatively related to learner preference for learner-learner interactions. Other individual characteristics (such as gender, work status, and personality traits) did not demonstrate a significant effect on learner preferences for all three types of interactions. The results of this research suggested the existence of other variables that could better predict learner preferences for online learning interactions.

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Chapter One: Introduction

Technology is often seen as a barometer of the development of a given society; few would contest the tremendous impact that advances in technology have had on our lives. While there are those such as Postman (1998) who address the negative influences that technology may have on human society, it is clear that technology has brought about irreversible change to our society. This point has been noted by Gates et al.: "One thing is clear. We don't have the option of turning away from the future. No one gets to vote on whether technology is going to change our lives" (1995, p. 74). Thus, rather than debating whether or not to adopt a new technology into teaching and learning, educators should acknowledge the reality of technologically induced change and concentrate on how to help instructors to effectively use the new technologies in their teaching and learning so that learning can be further enhanced. After all, "the best way to predict the future is to make it" (Kay, as cited in Frick, 1991, p. 32).

Statement of the problem

As a result of the speedy technology development, Web-based teaching and learning has become a promising field of modern higher education. In the United States alone, the number of students enrolled in distance education classes has increased from about 750,000 in 1994-1995 academic year to an estimated number of over 3,000,000 in 2000-2001 academic year (U.S. Department of Education, 1997, 2003). The same governmental reports showed the number of courses offered in distance increased five fold during this period.

In order to maintain the competitive edge, many higher education institutions have chosen to offer online courses. In 2001, 60% of the campuses in the United States offered at least one online course (Kingsley, 2002). About 88% of the institutions that currently offer

distance education expressed their willingness to increase the number of distance courses in the next few years. Based on a survey of over 1,100 colleges and universities, the Sloan Consortium (2005) reported that the online enrollment growth rate in 2003 was 19.8% and was 24.8% in 2004. The increasing enrollment is certainly wanted from an organizational perspective; however, the main concern is the quality of these online programs. The ultimate goal of education is to make sure that students learn.

How do we guarantee a high quality online program with increasing numbers of students? What are the preeminent pedagogical experiences that can help establish a high quality online program? These questions are not new in the field, but the search for answers to these questions is still continuing. Although educators know that research should provide guidance for the practice, research in online education has lagged behind its practice. Therefore, empirical studies of improving quality and ensuring that learning happens in online environments are greatly needed in the field of distance education and thus should be emphasized and encouraged.

Through interviewing and surveying about 150 faculty, administrators, and students, the Institute for Higher Education Policy (2000) pointed out seven categories of quality benchmarks for online courses. The research report showed that interaction is a critical element for a quality online education. Two out of the three benchmarks listed under the teaching/learning category emphasized the importance of interactions: "student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or e-mail" and "feedback to student assignments and questions is constructive and provided in a timely manner" (p. 26).

Many other educators also point out the significance of interaction by stating "(the) keys to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions" (Palloff & Pratt, 1999, p. 5), and interaction is "a critical component of formal education regardless of whether there is research showing a direct link to effectiveness" (Berge, 1999, p. 5). Moore pointed out in his study of general distance education that increasing the interaction between learner and instructor can lead to a smaller transactional distance (a physical separation that results in a psychological and communicative gap) and more effective learning (1992). Studies in the literature also suggests that increased amount of interaction in distance courses is correlated with higher academic achievement and student satisfaction (Irani, 1998; Swan, 2001; Zhang & Fulford 1994; Zirkin & Sumler, 1995).

Although literature shows the importance of interactions for quality distance education, interaction seems lacking in many online courses (El-Tigi & Branch, 1997; McGorry, 2002). Instructor unfamiliarity with technology seems to be one of the key reasons why they do not know how to enhance online interactions in practice (Stenhoff et al., 2001). A study from the National Center for Education Statistics (2001) concurs on this point. It reports that one of the greatest challenges of teaching online is the lack of guidance on how to teach with new technologies. This is often because the skills required for teaching online are quite different from skills required for face-to-face teaching (Daniel, 2003; Shutt, 2003). Therefore, the fundamental issues of teaching online are not limited to the issues of technology; actually they are pedagogical in nature (King & Doerfertl, 1996; Oswald, 2003). It seems obvious that online instructors should re-examine the original assumptions and teaching methods in order to provide rich learning experiences to online learners.

As part of this concern about helping online instructors increase course quality and given the fact that there is lack of research on the pedagogical issues of online interactions (Kearsley, 1995; Jiang & Ting, 1999), I have decided to conduct this dissertation study on the instructional activities that can help promote interactions in Web-based education.

Student preferences for these instructional activities will be scrutinized in the current study for two reasons. First, students are the ultimate recipients of online education. Their voices should be heard and reflected in the course design process. Some may argue that research on student preference is not really useful since students may prefer an easy and effortless learning process and, thus, their preferences toward learning might not enhance educational value. There is a study, in fact, shows that younger students tend to prefer fun and easy learning activities that may not have direct contribution to what they are supposed to learn (Jones et al., 1996). That research was conducted on high school students in which researchers matched or did not match student preferences for team and individual learning methods. Results indicated that students who preferred team learning while assigned to team learning environment, exhibited more off-task behaviors such as chatting things unrelated to the study topic than those with a low preference for group work. Therefore, a preference for team work did not predict better performance under group work.

However, it is important to note the differences between young and adult learners. "Mature students had better study habits than the younger students in that they engaged in more 'deep' and less 'surface' learning than did the younger students" (Trueman & Hartley, 1996, p. 201). Opposite to the previous research on younger students, studies on adult learners show that considering learner preferences in the educational process has positive effects on learner satisfaction and performance (Beets & Lobingier, 2001; Freitag & Sullivan,

1995; Katz, 2002; Yu et al., 2002). The experimental study of Freitag and Sullivan (1995) demonstrated that adult learners who received preferred instructional strategies scored significantly higher on the posttest, spent significantly less time in the program, and had more positive attitudes toward the learning process. These differences between young and adult learners can be further explained by Knowles's theory of andragogy. He (1984) pointed out that adult learners might experience "cognitive dissonance" if they were not allowed to direct themselves. If they are forced to study in certain ways, "this condition expectation conflicts with their much deeper psychological need to be self-directing, and their energy is diverted away from learning to deal with this internal conflict" (p. 9). It implies that if adults are given enough control over their learning and if their needs are addressed, they can make the learning experience more meaningful for them. Therefore, addressing student preferences in this graduate level study should help tailor the online courses, and, thus, can serve them better.

Secondly, although there is a substantial body of literature (as discussed earlier) demonstrating that students perceive interactions as important elements of online education in general, it is possible that students may not want to have more interactions because of various constraints -- such as job or family responsibilities, limitations caused by the technology-mediated nature of online education, individual trait differences, and so on. By understanding student preferences better, an environment more suitable to learning can be created. The quality --rather than quantity-- of the interactions used must be carefully considered as teachers design their instruction to meet the needs of learners. Therefore, it seems critical to understand the factors that affect student preferences for the instructional

activities that promote various interactions in the online environment. This research results should be a significant contribution to the overall teaching practice in online education.

Research questions and research goals

Four overarching questions of the current study are listed below. The descriptions of the sub-questions and the methods of collecting and analyzing data on each question will be discussed in detail in Chapter 3.

Q1: Which instructional activities are used to promote online course interactions?

The research goal of this question is to determine which teaching and learning techniques are used in practice. Although individual instructors have been using a number of valuable techniques to promote online course interactions, there is an inevitable need to synthesize these techniques for the practical purpose of knowledge sharing in the field.

Q2: What are the learner preferences for these instructional activities?

The second question aims to explore student reflections on the instructional techniques which result in effective and satisfying online learning experiences. Even though Q1 can tell us what techniques are used to promote online course interactions, they heavily depend on instructor preferences, experience, and perceptions, and thus will not be able to tell us whether students like them or not. Q2 should provide additional insights to the overall issue of promoting online interactions by adding student voices to the course design process.

Q3: Is there a relationship between learner's gender, age, prior educational level, online experience, work status, marital status, or personality and preferences for the instructional activities that promote online course interactions?

With respect to the research goal, Q3 focuses on determining whether learner demographic and personality traits have an impact on learner preferences on the teaching and

learning techniques that promote interactions. Although some point out that personality and learning style may both have effects on student preferences for learning activities, personality is chosen as a variable in this study. The main reason to look at personality is because its theoretical construct and measurement are considered to be fairly mature compared to those of learning style. Robotham (1999, p. 9) indicated that "research into the relative stability of learning style as a construct remains both confusing and confused." Pinto et al. (1994) found that the student learning styles are prone to change over time. As a result, many studies that involve learning styles failed to show significant differences and meaningful contributions due to the poorly designed instruments and a lack of theoretical basis (Harrison et al, 2003). Given these concerns, this study will not examine the effects of individual learning style differences on the learner preferences on the instructional activities that promote online interactions.

Q4: Why do learners prefer some instructional activities over others?

This question will be addressed in the follow-up study to help us understand why learners prefer some instructional activities over others. Q2 and Q3 research results can tell us student preferences for certain instructional activities and the potential relationships between the preferences and individual learner characteristics. Based on the result of Q2 and Q3, specific interview questions will be generated to investigate other possible reasons that affect learner preferences for interaction activities. This piece of qualitative data can complement the limitations of quantitative data to make the study stronger.

Significance of the study

Many have pointed out that lack of interaction in online education often increases the learner's feeling of isolation (Carnegie, 1998; Ross, 1996; Vrasidas & McIssac, 1999). The

increased feeling of isolation then contributes to course drop-outs, and, thus, raises the rate of attrition (Miltiadou & McIssac, 2000; Parker, 1995). Therefore, the practical significance of this study is to provide empirical evidence on which instructional activities are preferred by students for enhancing online interactions. The increased interactions should, in turn, help decrease the attrition rate. A number of educators in the distance education field, including online instructors, department chairs, and instructional designers, can benefit from this research in order to offer quality online courses and a sustainable online program. A solid understanding of how demographic and personality traits affect the learner preferences for instructional activities can further yield practical insights into the overall course design process by taking these variables into account.

Moreover, the results of this study can contribute to the knowledge pool associated with online instructional design and development. Interaction is such a critical factor for successful online education. It helps build satisfactory learning experiences for learners and enhances learner engagement and achievement, in general. The instructional activities that are incorporated into daily teaching and learning often reflect the instructor's preferences rather than those related to effective learning experiences of enhancing student satisfaction and learning achievement (Bernard, 2001; Guernsey, 1998). The choice of technologies that are used to carry out the instructional activities online is more often decided by economic, technical, or even political motives rather than pedagogical rationales (Soo & Bonk, 1998). As a result, student voice and control over their learning experience seem quite limited and restricted. Therefore, understanding how to increase interaction in an online environment and how to tailor the teaching and learning activities to meet individual needs will inevitably help extend knowledge about instructional effectiveness of distance education.

In sum, the significance of this study is two-fold. First, from the practical point of view, the results of this study can provide empirical grounds for understanding student preferences for instructional activities that promote online course interactions. Such an understanding can help practitioners modify their instructional strategies to offer a satisfactory course. Second, from a theoretical point of view, the statistically determined relationships among student individual traits and preferences can contribute to the knowledge associated with the use of instructional activities as mechanisms for generating online course interaction and thus inevitably enrich the body of literature on enhancing online course quality in general. To my knowledge, such an empirically-based research study is greatly needed in the field of online education.

Scope of the study

Interaction is a complex concept that encompasses different types of communication patterns. To date, the interaction between learner and instructor and the interaction among learners have drawn most of the attention in the field of online interactions. To provide a holistic and overall picture of the online interaction, this study will discuss all types of interactions from the literature first and then a new classification scheme will be used to research learner-instructor, learner-learner, and learner-self interactions.

Three major bodies of literature will be reviewed in this study. First, literature on the development of distance education and associated theories, the construct of interaction, and the importance of interaction in online education will be discussed. Second, a substantial body of literature on instructional activities that promote interactions will be examined to determine which instructional techniques will promote what types/dimensions of online course interactions. This section covers both human-human interactions and human-

technology interactions. Third, the literature on the importance of individual learner attributes in online education will be reviewed. The literature will be reviewed across several related fields including online education, instructional and learning theories, instructional technology, computer-mediated communication, and personality psychology. The main publication sources will be from *American Journal of Distance Education*, *Journal of Distance Education*, *Quarterly Review of Distance Education, Educational Technology, Educational Technology Research and Development*, *Handbook of Distance Education* , *Dissertation Abstracts*, and relevant books and instrument reviews.

Overview and organization of the study

Chapter 1 includes the statement of the problem, research questions, research goals, significance, scope and organization of the study. Chapter 2 provides a review of literature across several related areas. Topics covered include the development of online learning in general, definitions of interaction; the importance of interaction; relevant theories and models of distance education; types of interaction and corresponding instructional activities and technologies; and attributes of online adult learners. Chapter 3 describes the methods that are employed to collect and analyze the research data. Chapter 4 presents the results of the data analysis according to the research questions. Chapter 5 discusses the research findings, implications, and recommendations for further study in related fields.

Chapter Two: Review of Literature

Development of distance education

By reading the existing materials about the history of distance education, we can divide the history of distance education into the following categories based on the technical medium employed in the educational process.

Correspondence study

The history of correspondence study can be traced back to the early 1800s in the United States and in several European countries as well. Writing and mailing were the major communication methods between the instructors and students in correspondence study. Degree programs started to be offered through correspondence study in the late 1800s in several American institutes and as well as in some European universities. Correspondence study continued to be the major distance education method until more sophisticated methods and media were developed.

Radio and TV

In the early 1900s, audiovisual devices were gradually employed in distance education without making dramatic changes in the structure of distance education. Starting in the early 1930s, television education programs were produced in America. With the development of satellite technology in the 1960s, instructional television programs became a new way of teaching and learning across a distance. Rapid expansions of television education occurred when satellite technology became cost-effective in the 1980s and when fiber-optic communication systems allowed high-quality audio and video systems in education.

Personal Computers and the Internet

Online education started in the late 1980s and became a dominant medium of distance education when Tim Berners-Lee developed the World Wide Web in 1991. Computer networks made it possible to distribute course materials to students in an efficient and effective way. The development of various synchronous and asynchronous communication tools further increased the possibility of sharing and collaborating among students and instructors.

From an economic perspective, the growth of online learning has been astounding. The profitability of the corporate online learning market in America alone in 2000 was over $1 billion (WBEC, 2000). Globally, the market of online learning was expected to exceed $360 billion in 2003 (WBEC, 2000). In higher education, about 67% of the institutions in the United States operated a distance learning program in 2003, and about half of these schools offered an accredited degree (Market Data Retrieval, 2003). The University of Phoenix Online is a frequently cited example of online learning in higher education. According to *BusinessWeek Online* (2004), the 12-month earnings of the University of Phoenix Online by May 2004 was $145.4 million, the 3-year average profit increase rate was 86.6%, and its market value exceeded $1.3 billion.

A recent cost analysis by Gaffney and Bancke (cited in Wills, 2003) of a distance education program that delivers a complete graduate degree can help deepen our understanding of where the expenses go in online education. Table 2.1 summarizes the analysis of Gaffney and Bancke. It is not difficult to tell that most of these expenses are ongoing costs that are necessary as long as the program exists.

Table 2.1: Major expense categories of an online program

Student and academic support	37%
Technology and production services	27%

Program administration	24%
Marketing support	7%
Research and development	5%

Increasing financial investment is certainly pushing forward the development of online education and is also bringing a positive attitude to the practitioners in the field. According to a study by Sloan Foundation that is based on responses from over 1,100 colleges and universities, 97 percent of public and large schools agree that online education is critical to their long-term strategy (2005). The same report claims that about 75 percent of all academic leaders believe that the quality of online education will be equal or superior to residential instruction in three years.

While the big picture of online education development demonstrates an encouraging landscape, many issues remain difficult thresholds to surpass. Educators point out that the key to successful teaching and learning resides in the pedagogy, not in the medium (Clark, 1983, 1994; Molenda, quoted in Oswald 2003; Reigeluth & Joseph, 2002; Schifter 2000). Collins and Berge (2003) indicated that instructors often do not possess the practical knowledge and skills of systematic instructional design in an online environment. Therefore, effective faculty training programs to support this "significant culture change" seem critical for successful online education (Bennett & March, 2002). However, faculty training programs seem to focus on how to use the technology itself rather than how to teach at a distance (Merkley, Bozik, & Oakland, 1997; Schifter, 2000). Ehrmann pointed out that "few educators, evaluators and researchers have paid much attention to educational strategies for using technologies with the result that too many… assume that if they know what the hardware is … they know whether student learning will occur" (cited in Bennett & Marsh, 2002, p. 14). Because of a lack of experience and pedagogical training on how to teach at a

distance, instructors tend to translate rather than transform their teaching experiences of traditional face-to-face classes. However, educators indicate that a new set of pedagogical skills is required to cultivate successful learning in an online environment since online teaching context is quite different from the traditional face-to-face context (Daniel, 2003; Schutt, 2003; Sewart, 1986). It seems clear that the pedagogical aspects of online education comprises an area that greatly needs more research in order to provide guidance for practitioners of online education.

Relevant theories and models of distance education

The theories that are relevant to the knowledge construction and transfer are discussed in this section in relation to online course interactions. The purpose is to provide multiple perspectives on the researched issues. Transactional Distance Theory (TDT), Theory of Interaction and Communication, Learner-Centered Movement, and Theory of Aptitude-Treatment Interaction (ATI) will be explored in this section.

Transactional Distance Theory (TDT)

Moore's transactional distance concept was built upon John Dewey's "transactional" conception of activity-based education views. In his book entitled *Experience and Education*, Dewey wrote that "an experience is always what it is because of a transaction taking place between an individual and … his environment…. (1938, p. 43). Transactional Distance refers to the psychological and communicative chasm, such as a potential gap of misunderstanding between the instructor and learners that is caused by the physical distance (Moore, 1993). Prior to the concept of transactional distance, definitions of distance education emphasized the physical separation of the instructor and learners. Moore proposed that TDT focuses more on the pedagogy rather than the geographical distance.

TDT concerns three key dimensions that are critical for the context of interaction in an educational program: (1) structure, (2) dialog, and (3) learner autonomy (Moore, 1993). "Structure" refers to the actual design of the instruction, including the content and media used. "Dialog" is the two-way communications between the instructor and learner, particularly the process of teaching and responding. "Learner autonomy" means the extent to which the learner's self-directedness and responsibility determine the learning objectives, experiences, and other relevant decisions during the learning process. The degree of transactional distance depends on the teaching and learning strategies that address these three variables. When course structure increases, dialog tends to decrease. Research studies indicate that the more autonomous the learner, the easier they can deal with the degree of the transactional distance; less autonomous learners tend to need more structure and dialog to keep them continuing in their studies (Marquis, 1999).

Moore's theory of transactional distance is a general pedagogical theory of distance education. It is an important theory in the field of distance education because it looks at distance education as a theoretical phenomenon and examines the potential issues from pedagogical perspectives. It points out that instructors can help diminish the pedagogical and psychological gaps in distance education by providing suitable course structure, promoting an appropriate amount of dialog, and taking the characteristics of learner autonomy into account.

Although "it was to be of sufficient generality to accommodate all forms of distance education and to provide a conceptual tool that would help students and others to place any distance education program in relationship to any other" (Moore & Kearsley, 1996, p. 199), it is important to note that the definition of dialog in TDT is mainly concerned about learner-

instructor interaction. Other types of interactions in online education that will be addressed in this dissertation are not directly reflected in the TDT. This can be due to the fact that TDT was developed before the prevalent usage of the Internet in education. It also can be due to the broad scope of the TDT which tries to accommodate all forms of distance education. Nevertheless, TDT is particularly relevant to the current dissertation study since all three variables of TDT will be at least partially examined in the current study:

- The instructional activities: essential component of course structure;
- Interaction: a purposeful communication process which often include dialog;
- Individual learner characteristics: individualized qualities that have inseparable relations with the learner autonomy.

Therefore, TDT provides a bigger framework for the current study. It also verifies that the current study is important research that addresses all three key variables of the TDT. Although it is not the goal of this study to directly relate the research result to the TDT, in the end, it will certainly contribute to our understanding of TDT by providing further empirical evidence.

Theory of Interaction and Communication

Holmberg's theory of interaction and communication emphasizes the significance of interaction between the teaching and learning parties as well as interaction with learner oneself. It suggests that frequent interaction between the learner and the educators in real time, as well as simulated interactions, are all essential elements for achievement and satisfaction. A simulated interaction can happen via the course materials that make learners consider different perspectives and solutions (Holmberg, 1995). An important contribution of this theory is that it points out that interactions can facilitate the ultimate learning on the

learner side by stimulating the knowledge internalization process. It further indicates that interaction with oneself is critical to enhance learning outcomes. In his earlier version of the theory of interaction and communication, Holmberg used "guided didactic conversation" (1995) to describe the roles that educators and learners perform in distance education. Later, he modified it to the "teaching-learning conversation" (2003) since the word "didactic" often indicates an authoritarian tone. This correction illustrates that the theory of interaction and communication is actually a learner-centered theory that treats each party equally in the interaction process.

Holmberg himself pointed out that the original version of his theory of interaction and communication in distance education failed to pay serious attention to technology development (2003). Despite this deficiency, the theory of interaction and communication demonstrated the indispensable characteristics that an effective distance education should contain: enhancing student motivation, addressing individual needs, promoting learning pleasure, creating empathy between the parties involved, facilitating engagement activities and interactions, etc. (Schlosser & Simonson, 2003).

Holmberg's theory indicates that distance education could be an effective way of teaching and learning that would be different from simple transfer of the course content and rote memorization of accepted facts. To surpass the contextual barriers of distance education, educators in distance education should use various interactive activities to enhance learning engagement and learner autonomy.

A summary of this theory is provided by Schlosser and Simonson (2003): "Holmberg's approach represents, on the one hand, a description of distance education and, on the other hand, a theory from which hypotheses are generated and which has explanatory

power in that it identifies a general approach favorable to learning and to the teaching efforts conducive to learning."

Equivalency Theory

In contrast to the theory of interaction and communication, equivalency theory emphasizes the importance of new technologies in distance education. Simonson, Schlosser, and Hanson (1999) posit that physical distance should not get in the way. Its core idea is to utilize new technologies to provide distance learners as equivalent a learning experience as the face-to-face learners have. It believes that the more similar the learning experience of distance learners to those of face-to-face learners, the more equivalent the learning outcomes will be. The equivalency theory has several key concepts: equivalency, learning experience, appropriate application, learners, and learning outcome.

Equivalency: Providing equal learning experiences. The learning environment for distance learners is quite different from the face-to-face educational context. Distance educators should not mechanically pursue the sameness in the instructional strategies and learning situations. Instead, they should use the teaching and learning activities that match well with the changed learning environment in order to provide learning experiences that have equal value for learners. Therefore, the concept of equivalency here is not the surface resemblance of instructional process, but the value or quality similarity of learning experience.

Learning experience: "A learning experience is anything that happens to promote learning, including what is observed, felt, heard, or done" (Simonson et al., p. 71). A different learning experience is often expected for different learners and/or in different

learning contexts. The equivalency theory argues that the purpose of instructional design is to ensure an equivalent sum of experiences for each learner.

Appropriate application: Choosing strategies and activities with consideration to the environment and learner. It indicates that teaching and learning methods should meet individual learner needs and also should take the learner's learning environment into account.

Learners: The participants within the learning environments. Learners should be defined by what courses they take, not by the locations from where they take distance courses.

Learning outcomes: those changes within learners who have grown cognitively and affectively through the learning process. It can consist of instructor-determined and learner-determined learning outcomes.

Advocates of equivalency theory argue that distance education will not become the mainstream of education until people perceive its quality as equivalent to those of face-to-face traditional education. "If equivalency is not what the public perceives, then distance education will continue to be peripheral to the field of education" (p. 72). However, like all theories, the theory of equivalency also has its limitations. First, it is quite difficult for practitioners to quantify the concept of equivalent value of experience. This difficulty diminishes the practical significance of the theory. Second, there is a lack of theoretical and empirical support for the logic that same learning experience should lead to similar learning outcomes.

Nonetheless, the equivalency theory is considered to be an emerging approach to distance education due to the fact that technology development is bridging the gaps that used

to be seen as unsolvable barriers. This theory is relevant to the current dissertation study from several aspects:

- It emphasizes the ability of distance education to provide valuable teaching and learning experiences.
- It points out that instructional planning needs to be different for different situations.
- It implies a need for personalized instruction by pointing out the potentials association between individual learner characteristics and pedagogical plan.

Theory of Aptitude-Treatment Interaction (ATI)

For centuries, educators have been seeking the best instructional strategies and activities to maximize student learning. This pool of knowledge has been changing and evolving over the years, especially with the integration of new technologies. It was acknowledged long before that individual learners differ in intelligence, ability to learn, environment, learning styles, personality, and many other characteristics that influence their learning progress (Nanney, 1999). The theory of Aptitude-Treatment Interaction (ATI) helps educators understand the importance of matching the instruction with individual learner characteristics.

ATI theory states that some instructional methods (treatments) are more or less effective for certain individuals than for others due to the different abilities (aptitudes) that individuals possess. “Aptitude is defined as any characteristic of the individual that increases (or impairs) his probability of success in a given treatment" (Cronbach & Snow, 1969, p. 5). Treatment refers to any manipulative situational variable (Snow, 1991). ATI research encompasses a wide range of aptitudes and instructional variables and is often used to

investigate new instructional strategies for effective course design. Cronbach and Snow (1977) indicated that aptitude treatment interactions are common phenomena in education, and many aptitude treatments interactions are too complex to draw clear conclusions.

A few principles that are highlighted in the theory of ATI are below:

- Individual aptitudes and instructional treatments interact in a complex way, and their interactions are affected by task and situational variables.
- Highly structured instructional environments, such as well-planned instructional sequences, tend to help learners with low ability but hold back learners with high abilities.
- Highly structured instructional environments tend to help nervous or compliant learners more than to help those who are relaxed or independent.

For the current study, ATI provides a theoretical basis and justification for carrying out the relationship studies between instructional activities and individual characteristics which is the third big question of the current dissertation.

In sum, there are several focal points of discussing the above four theories in this section. Transactional Distance Theory emphasizes pedagogical issues in distance education and the importance of balancing relationships of course design, learner-instructor interaction, and learner autonomy. The theory of Interaction and Communication adds value to the current discussion by pointing out the importance of learner-self interaction that actually helps learners construct the knowledge internally. Equivalency Theory advocates the use of new technologies to bridge the potential communication gaps that used to result in unequivalent learning experiences for distance and face-to-face learners. Theory of Aptitude-

Treatment Interaction points out the importance of taking individual differences into account while planning for an instruction.

Defining interaction

"Interaction" has been defined and categorized in many different ways in the literature (Gilbert & Moore 1998; Hirumi 2002; Wagner 1994). Rose (1999) pointed out that especially in the domain of instructional technology, the concept of interaction is "a fragmented, inconsistent, and rather messy notion …" (p. 48). What makes it more confusing is its interchangeable usage with the term "interactivity." For example, if moving the mouse cursor to a button on the computer screen makes the button change color or depth, this Web page is considered to be interactive because it reacts to the user's actions (Robertson, 2002). This type of computer interface response to user action is defined both as interaction (Hillman, 1994; Hirumi, 2002) and interactivity (Sims, 2000; Wagner, 1997). However, Wagner (1994, 1997) pointed out the explicit differences between the concepts of "interaction" and "interactivity":

> "…interactions are reciprocal events that require at least two objects and two actions. Interaction occurs when these objects and events mutually influence one another. An instructional interaction is an event that takes place between a learner and the learner's environment" (1994, p. 8).

On the other hand, she said, interactivity "appears to emerge from descriptions of technological capability for establishing connections from point to point (or from point to multiple points) in real time" (p. 20, 1997). Others in the field also allude to the technology-dependent nature of the concept of interactivity. Sims defined interactivity as "those functions and/or operations made available to the learner to enable them to work with content

material presented in a computer-based environment" (2000, p. 46). Heeter (1989) indicated that the term "interactivity" has yet to be clearly defined; however, it is often used as a concept to differentiate among new technologies. From these perspectives, interaction seems more process-oriented and emphasizes mutual influences. Interactivity is more feature-oriented and focuses on the attributes of delivery systems that cause responses to user actions. Despite an effort in the literature that attempts to distinguish the concepts of "interaction" and "interactivity," in reality, people often use them interchangeably.

For the purpose of this dissertation, Robertson's definition of interaction is adopted since it fits well with the teaching- and learning-oriented focus of the current dissertation study. Based on Wagner's definitions of interaction, Robertson (2002) pointed out that interaction in an educational context should have four attributes. First, interaction must involve an event. Second, the event must be reciprocal. Third, it should engage participants in conscious cognitive activity. Fourth, it should contribute to the learning outcomes. The third and the fourth attributes of his definition are especially important to the current dissertation study since this study examines the instructional activities that promote interactions. The purpose of interaction becomes meaningless without the learner consciously and cognitively engaging and contributing to the learning outcomes in an educational context.

Importance of interaction in online education

> "Interaction has been and continues to be one of the most hotly debated constructs in the realms of distance learning, instructional design and academic transformation, to name three. Interaction continues to be perceived

as the defining attribute for quality and value in the online learning experience" (Wagner, in press).

There are two sets of empirical evidence in the literature about the importance of interaction in online education. One set is perception studies on the importance of interaction and the other set discuses the importance of interaction in relation to critical learning factors such as learner motivation, engagement, satisfaction, and achievement.

Perceptions on the importance of interactions

Do learners and instructors perceive interaction as an important element of online learning? Are certain types of interaction perceived more important than other types?

To provide empirical evidence related to these questions, Monson (2002) conducted a perception study on the importance of interaction in online education. Based on 265 undergraduate student respondents, he concluded that both learners and instructors perceived learner-instructor and learner-learner interactions as important factors in online learning. Learning through observing others interact was also considered to be critical for successful online education. Furthermore, he found that gender, prior education level, and prior online experience were related to perceptions of the importance of online interactions, while subject matter did not show any significant influence on those perceptions.

A research study (N=183) on student perception of online course showed that the more interactive the course design, the more the students perceived learning happened (Jiang & Ting, 1999). This same study also discovered that student class participation is positively correlated with the interactive level of the instructor involvement ($r=.61$, $p<.01$).

A recent case study of an online MBA program revealed that instructors perceived interaction as an important aspect of learning in online environments and attempted to

enhance course interactions as much as possible (Su et al., 2005). Students, however, varied in their preferences for having more interactions in online courses, even though about 94 percent of the survey respondents believed that interacting with other students and instructors created more meaningful learning experiences. The researchers concluded that such preference variation might be related to the individual differences in personalities and learning style. It also could be due to the fact that these students were working full time while taking the online courses, and they simply did not have time to engage in extensive interactions. After all, preferences and perceptions are two different things. This is one of the reasons why this current dissertation explores student preferences instead of perceptions.

From the above discussion, it is safe to conclude that empirical evidence shows, in general, that students and instructors perceive interaction as a critical factor in online education. Many point out that perception matters (Dormant, 1999; Prochaska et al., 1994; Rogers, 2003), although it is considered to be one of the earliest stages of cognition that occurs before further processing can happen (Winn, 1993). If people do not perceive something as important, they will be reluctant to spend time and energy on promoting its further development. Thus, the generally positive perception studies in the literature are good indicators of the importance of interaction in online learning.

The importance of interactions in relation to the learning process

Interaction in distance education is critical not only because people think it is important, but also because it directly relates to learner participation, motivation, and engagement during the learning process. Schweir points out that "all things being equal, participation and motivation share variance. Involving the learner cognitively,

physically, or emotionally in a program will at least engage the learner in the program, and this is a necessary prerequisite for motivation" (1991, p. 195).

Lack of interaction in online courses often result in learner feelings of isolation (Carnegie, 1998; McIssac et al., 1999; Wolcott, 1996). One of the key results of the online courses is feelings of isolation caused by lack of interactions (Miltiadow & McIssac, 2000). This point can be further illustrated by Ullmer's (1994) research. He found that increased interaction can significantly decrease the course attrition rate. When he introduced enhanced course interactions, the learner retention rates in the class increased from 20% to about 75% in audio- and video-based training.

Kitchen and McDougal (1999) conducted a study of online graduate students and found that sharing and building knowledge together was an extremely motivating learning process for students. Bullen (1998) conducted a qualitative study on a computer conferencing distance course. The researcher interviewed a total 13 students and instructors. The results showed that the more interactive the course, the more actively students participated and engaged in critical thinking. Thus, the interactive nature of the course design seems to have a positive relationship with learner motivation, participation, and engagement.

In her recent article, "On designing interaction experiences for the next generation of blended learning," Wagner (in press) indicates that interaction should be viewed less as a theoretical construct and should be treated more as a strategic variable that needs to be fully utilized in technology-mediated learning designs to achieve desired instructional goals and learning outcomes. She illustrates the

importance of interaction by pointing out a number of specific targeted outcomes that interaction can serve:

- *Interaction for participation*: provides ways to engage the learner;
- *Interaction for communication*: promotes information sharing and mutual influences;
- *Interaction for feedback*: helps learner to evaluate how well they are doing
- *Interaction for elaboration*: deepens learner understanding on the subject matter through offering alternative explanations;
- *Interaction for Learner Control/Self-Regulation*: helps learner to manage the scope and sequence of the content, pace, and time spent on the tasks, etc.;
- *Interaction for motivation*: encourages learner curiosity, creativity, and critical thinking;
- *Interaction for negotiation*: helps learner to get to consensus and agreement;
- *Interaction for team-building*: sets dynamic teamwork environment for members to support the team goals;
- *Interaction for discovery*: drives learners to be creative and to find new ideas through sharing thoughts and perspectives;
- *Interaction for exploration*: provides ways to define the scope and depth of a new idea; and
- *Interaction for clarification*: articulates sometimes misunderstood concepts or performance expectations;

In sum, interaction is valued in online education by learners, instructors, and experts. Therefore, it is critical to explore which instructional activities and strategies can be utilized in online education to promote interaction in order to accomplish desired learning goals.

Types of interactions

In this section, types of interaction from literature will be discussed first. Then a new classification scheme will be explored based on the operational definition of interaction that was defined earlier in this chapter. Due to a lack of consistency regarding the definition of "interaction," different authors have identified different types of interaction in literature. A frequently-cited classification of interaction in distance education is presented by Moore (1989) who articulated three main types of interaction: learner-instructor, learner-learner, and learner-content. Others types of interaction include learner-interface interaction (Hillman et al., 1994), learner-self interaction (Soo & Bonk, 1998), and vicarious interaction (Sutton,1999, 2001).

Learner-instructor interaction

Learner-instructor interaction happens when an instructor communicates with a learner or a group of learners. The instructor often plays the role of expert, tutor, or facilitator by providing information, feedback, or guidance to learners. This type of interaction is "regarded as essential by many educators and highly desirable by many learners" (Moore, 1989, p. 2). Several empirical studies also indicate that learners perceive learner-instructor interaction as the most critical type of interaction in distance learning (Monson, 2002; Thompson, 1990). This type of interaction in online education is becoming more direct and prompt due to the rapid development of new technologies. As a result, learners in online

programs feel that they have even more interaction than they would have in a face-to-face learning environment (Westbrook, 1999).

Learner-learner interaction

Learner-learner interaction takes place "between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor" (Moore, 1989, p. 4). Through such interaction, learners can share ideas, collaborate on tasks, gain multiple perspectives, encourage and support each other, etc. Many studies show that this type of interaction is a valuable experience and resource of learning (Bull, Kimball, & Stansberry, 1998; Vrasidas & McIssac, 1999). Much empirical evidence also indicates that students actually desire learner-learner interactions regardless of the delivery method (Grooms, 2000; King & Doerfert, 1996). Vrasidas and McIssac (1999) indicate that collaborative instructional pedagogies such as group activities are needed to facilitate learner-learner interaction in online education.

Learner-content interaction

Learner-content interaction is defined by Moore as "the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind" (1989, p. 2). Modern technologies have enabled content to be presented in many forms including printed materials, text-based Web pages, and multimedia clips on the computer screen. Westbrook (1999) pointed out that online learners tend to engage extensively in learner-content interaction since online learning is largely text-based.

Learner-interface interaction

Given the technology-mediated nature of online education, learner-interface interaction is considered to be another important type of interaction. Hillman et al. pointed out that this type of interaction occurs between the learner and the communication media used during the learning process (1994). She further noted that it can be one of the most challenging types of interaction due to the fact that people are not used to it in traditional classroom education. A qualitative study (N=104) of Wu (1999) revealed that users' attitudes toward a Web site is positively related to their perceived interactivity of the Web site, such as the responsiveness and navigability. To improve learner-interface interaction, on one hand, learners need to possess the necessary technology skills (Harmon & Jones, 2000; Ross, 1996), and on the other hand, the design of media interface should be friendly (Barnes & Lowery, 1998; Marshall, 1999).

Learner-self interaction

Learner-self interaction is defined by Soo and Bonk as "the learner's reflection on the content, learning process, and his new understanding" (1998, p. 3). They further indicate that learner-self interaction emphasizes the importance of 'self-talking' when engaging with learning content. Therefore, the reflection and synthesizing process on the learner side is actually the procedure of learner-self interaction. The significance of reflection has been indicated by many educators as a way to promote independent thinking, self-directedness, and self-regulation (Ertmer & Newby, 1996; Soo & Bonk, 1998; Wagner, 1997).

Vicarious interaction

Vicarious interaction happens when "a student actively observes and processes both sides of a direct interaction between two other students or between another student and the instructor. Interaction in this sense is not firsthand, but one level removed, hence the term

"vicarious" (Sutton, 2001, p. 227). The assumption is that learners still can learn much by observing others interact. One of the benefits of such interaction is for the learners who are not willing to engage in a direct interaction for various reasons (Robertson, 2002). They still can get answers to their questions by observing others interact such as reading others' communication messages in an online environment.

New classification of interaction

In the previous section, commonly cited interaction types were discussed to provide a fairly holistic picture of the literature regarding interactions. Unfolding various discussions and definitions of interaction are necessary for the next step, which is to identify the instructional activities that can enhance each type of interaction in online teaching and learning. For this purpose, there is a need to further synthesize and classify the types of interaction so that the new classification can reflect and match the operational definition of interaction that is used in the current study.

Although learner-content interaction, learner-interface interaction, and vicarious interaction are raised as types of interaction in the literature, they will not be included in the current study for several reasons. First, the operational definition of interaction in this dissertation clearly points out that interaction should be a reciprocal event. Even though a learner is learning from a given content or through computer-mediated interface, the process seems to be one-way. As Sutton (2000) indicated, "content and a computer interface are inanimate, they are not 'actors,' and, therefore, cannot literally interact with human learners" (p. 7). Some may claim that learner-interface interaction has a certain degree of interaction between the interface and learner, such as clicking on a button may lead the learner to a new Web page. However, those interface reactions are often programmed in advance, and, thus,

fail to meet the criterion of "conscious cognitive activity" on the part of participants in current definition of interaction. Similarly, observing others interact will influence what others have already discussed. From this perspective, learner-content, learner-interface, and vicarious interactions are technically not an interaction either.

Second, these three types of interaction can be incorporated or can be included in the learner-self interaction since the ultimate process of change that results from these interactions happens cognitively in learner's mind. For example, Devries (1996) pointed out that "vicarious interaction means that learners are participating internally by silently responding to questions" (p. 181). This means that each learner is processing the information by talking to oneself, trying to convince oneself about what is right and what is believed to be correct. Moore (1989) indicated that learner-self interaction can be treated as an essential part of the learner-content interaction. In contrast, I argue that learner-content interaction should be considered a part of learner-self interaction, which fits in the definition of interaction that emphasizes mutual influence because the content does not react to learner actions. But a person can react with oneself through self-talk; we may think this process as a person talking to the "old oneself" that has a different or earlier version of mind-set.

Thus, this dissertation study will focus on exploring those instructional activities that can promote the learner-instructor, learner-learner, and learner-self interactions in the online environment.

Instructional activities to promote interaction

Constructivism posits that knowledge is generated by the learner through his or her interactions in the environment. People build meaning and make sense of their world through interacting with their surroundings. Social constructivists believe that learning occurs

through social dialogue and shared experience (Jonassen et al., 1995). From this perspective, interaction is vital for learners to construct the knowledge internally. While some doubt that online learning can ever provide the degree of interaction that learners may have seen in their face-to-face learning (Smith, 1996), others believe that online courses can have the same or even greater degree of interaction compared to that of traditional face-to-face courses. For example, Miller and Webster (1997) found that there is no significant difference in terms of amount of interaction happened between students in face-to-face and distance courses in their particular study.

Several researchers found that online courses could be more interactive than face-to-face courses if they contain appropriate instructional design that provides prompt and personal feedback to meet the learner's individual needs (Hirumi & Bermudez, 1996; Horn, 1994). As Garrison (1993) indicated, "no important impact can be expected when the same old activity is carried out with a technology that makes it a bit faster or easier; the activity itself has to change" (p. 13). King and Doerfert (1996) also point out that "interaction is not a phenomenon that simply occurs; it needs to be an intentional part of the learning design for the course to be taught. Each element of the learning opportunity (the teacher, content, context, and methods) must complement each other and include flexible opportunities for interaction" (p. 37). Therefore, the key question is what are those instructional activities that can promote interactions in online learning?

An *instructional activity* is an educational event that helps students understand the content better and enhances their engagement in learning. It is somewhat different from the traditional concept of *instructional method*. In general, a unit of instructional activity is smaller than a unit of instructional method. For example, case-based learning is considered

to be an instructional method that uses real or hypothetical cases to help students develop critical thinking skills and analytic ability for later use in the real world context. This one method can have many instructional activities to help accomplish the instructional goal. Bonk and Kim (1998), for example, outlined a number of instructional activities that could be used to help scaffold cased-based instruction, such as questioning, feedback/praise, encouraging articulation/dialogue prompting, and management, to name a few. There can be any number of instructional activities used to promote course interactions, thereby creating an environment more conducive to learning. So what are those instructional activities?

Educators have been employing various activities on their own to enhance interaction and increase learning. For example, Branon and Essex (2001) pointed out that virtual office hours can help enhance the learner-instructor interactions and other types of interactions in online education. In addition, Peters (2000) noted the importance of teamwork in learner-learner interactions. Similarly, Sutton (2001) encouraged students to read others' online discussions to learn through vicarious interactions, or as I shall call it here, learner-self interaction. In addition, Kerka (1996) recommended that learners respond to questionnaires in order to enable students to self-examine their opinions on the content and, thereby, increase learner-self interaction.

The evidence in the literature suggests that there are numerous valuable instructional activities in practice. Despite all the literature promoting the importance of online interaction, the field is lacking in synthesis. There is no clear direction or guidance on how to promote online interaction. The present study will help address this research gap by synthesizing the instructional activities according to the types of interaction they can promote.

To promote learner-instructor interaction

Learner-instructor interaction is a "multidimensional relationship" that involves variables such as the level of social presence, accuracy and promptness of feedback, and the depth of dialogue (Berge, 2002; Gunawardena, 1995; Muirhead, 2005; Swan, 2001). Since learners are physically distant from the instructors in the online environment, it becomes especially important for instructors to use strategies that can promote social presence, feedback quality, and meaningful conversations. As Jaffee indicates, instructors must generate a class structure that promotes interactions as well as independent learning skills (cited in Muirhead, 2005). Based on dozens of tactics that are suggested by various educators for promoting learner-instructor interaction, a synthesized list of instructional activities is generated below:

- Use synchronous lectures that allow real-time questioning and responding (Swan, 2003)
- Use asynchronous lectures that involve delayed questioning and responding (McDonald & Gibson, 1998; Swan, 2003)
- Incorporate virtual office hours for individual synchronous consultation (Branon & Essex, 2001; Hirumi, 2002)
- Involve participation by instructor in group-level discussions (McDonald & Gibson, 1998; Stewart et al., 2004)
- Involve participation by instructor in class-level discussions (Bonk et al, 2002; Stewart et al., 2004)
- Check on learner progress regularly to see how each is doing (Stewart et al., 2004)

- Push learners to explore more by providing probing questions (Bonk et al., 2002; Eisley, 1995)
- Make the quality and quantity of learner responses as part of the overall grade (Swan, 2003)
- Provide prompt feedback to learners (Bonk et al, 2002; Swan, 2003)
- Set clear expectations regarding learner participation and responses (Bonk et al., 2002; Stewart et al., 2004; Swan, 2003)
- Incorporate informal social communication between learner and instructor (Belanger & Jordan, 2000)
- Invite expert guest speakers to communicate with students (Peters, 2000)
- Provide frequent opportunities for evaluation (Swan, 2003)

To promote learner-learner interaction

- Set up small group asynchronous discussions (Cantrell, 2002; Godinho & Shrimpton, 2002). Each group may have three to six learners.
- Encourage class-level large group asynchronous discussions (Cantrell, 2002).
- Allow for synchronous chat among peers
- Assign team-based collaborations (Harris, 1994; Hirumi, 2002; Peters, 2000)
- Assign roles for teamwork (Bonk & Reynolds, 1997)
- Assign learners to debating teams (Bonk & Cummings, 1998)
- Use role-playing (Bonk & Reynolds, 1997; Galambos, 2001)
- Have learners to evaluate each other's work and give peer feedback (Bonk & Cummings, 1998; Muirhead, 2005; Peters, 2000; Swan, 2003).
- Allow learners to share information and resources (Bonk & Cummings, 1998)

- Encourage learners to share experience and beliefs (Muirhead, 2005; Swan, 2003)
- Grade on the quality and quantity of learner discussions (Swan, 2003)

To promote learner-self interaction

- Encourage learners to reflect on what they learned (Bonk & Cummings, 1998; Swan, 2003)
- Ask learners to read over others' discussions (Sutton, 2001; Swan, 2003)
- Require learners to prepare questions for the next academic topic or lesson (Bonk & Reynolds, 1997; Robertson, 2002)
- Provide individual problem-solving opportunities, such as responding to academic questions individually (Hirumi, 2002)
- Encourage learners to summarize key points of major topics or discussions (Bonk & Cummings, 1998; Peters, 2000; Swan, 2003)
- Ask learners to write critiques about the academic content (Bonk & Reynolds, 1997; Swan, 2003)

Similar to how different types of interaction have different effects on learning outcomes (Hirumi, 2002) and learner satisfaction (Fulford & Zhang, 1993), different strategies are needed to foster different types of interaction. As indicated, the focus of the current study is on the instructional activities that promote learner-instructor, learner-learner, and learner-self interactions. The activities are generated from synthesizing several dozen instructional tactics and techniques from relevant literature. These activities can be a valuable tool kit for instructors when there is a need to promote interaction in their teaching. However, it is important to note that using these activities does not mean that interaction will take place inevitably (Robertson, 2002). Many other variables such as learner autonomy, personality,

and numerous contextual issues can have a significant impact on whether the interaction can occur as expected. Therefore, these instructional activities are necessary, but not sufficient conditions for interactions to happen in an educational setting.

Learner attributes: gender, age, online experience, and personality traits

While it is important to explore which instructional activities are effective strategies to promote online interactions in general, it is also critical to understand whether learner differences can have an impact on preferences for online instructional activities. Hiltz (1998) indicated that factors influencing online interaction could be less due to the technology and more dependent on the student individual characteristics. If this is true, we should ask "Which attributes may be related to the learner online interaction? And how?"

Gender

A number of researchers pointed out that gender can be a factor in determining the amount and pattern of interaction in computer-mediated learning (Graddy, 2004; Herring, 1993, 1994, 2000; James & Drakich, 1993; Selfe & Meyer, 1991). Herring found that male communication style tended to be self-promoting and assertive whereas female online conversations were more apologetic and supportive (1994, 2000). Her research further indicated that during the online discussions, female learners were less persistent when others did not respond to their postings. But, female learners were active participants when there was an instructor or facilitator who led the discussion or coordinated the group dynamics.

Based on an extensive review of the literature on communication studies, James and Drakich (1993) concluded that males talk more than females in mixed-gender discussions and females tend to spend more time talking with each other than males do. Monson's (2003) study showed that gender plays a significant role when it comes to the importance of certain

instructional activities such as informational feedback and intellectual discussions. Females perceived informational feedback in online courses as more important than males, while males perceived intellectual discussion more positively than females.

Given the review of the literature above, it is reasonable to assume that gender differences can be an influential factor that impacts learner preferences for activities during online interactions. Although it is quite possible that gender differences may not play a role on learner preferences in all instructional activities that can promote online interactions, examining any interaction effects of gender and preferences for activities still will deepen our understanding of the current topic and thus can provide practical implications for online educators.

Age

Age can be a factor that affects the amount and types of interaction desired. Kearsley (1995) points out that older people prefer less interaction while young people desire more. Vampola (2001) conducted a study of learner preferences for various adult training activities in a corporate training setting. Based on a sample of 281 adults with a mean age of 40, he found that older trainees preferred private implementation activities such as individual learning time and did not prefer coactive analysis activities such as small group discussions. Therefore, it is possible that age will have positive correlation with preferences for learner-self interaction and will have negative correlation with preferences for learner-learner interactions. Since there is no empirical evidence that shows any relationship between age and preferences for learner-instructor interaction, it is difficult to predict the association direction between them. It is possible that age will not have any impact on learner preference for learner-instructor interactions since this type of interaction is desirable for all learners.

Online experience

The third concern of individual learner differences in this study is the prior online experience of the learners, specifically looking at the number of previous online courses they have completed. Based on survey research on 265 online students, Monson (2003) found that prior online experience was related to learner perceptions of interaction. "Less experienced learners had a more positive perception of the importance of vicarious learner interaction than did those with greater amounts of online course experience" (p. 111). Although vicarious interaction is not an independent type of interaction that this dissertation study is interested in examining, there can be a substantial overlap on the instructional activities used to promote vicarious interaction and learner-self interaction due to a great deal of overlap between these two constructs. Thus, it is possible that learner prior online experience will negatively associate with learner preferences for learner-self interactions. Furthermore, it is logical to assume that a more experienced person would have a more advanced set of skills and thus would have different expectations and preferences on their daily study than a less experience person.

Personality

One's personality trait is another aspect of learner differences of concern in this study. Although personality traits have been acknowledged as an influential factor in how people learn (Lawrence, 1997; Myers et al., 1998), researchers have pointed out that little is known about how learner personality traits may influence online interactions and communication preferences (Chen & Caropreso, 2004; Irani et al., 2003). Understanding how personality may affect the online interaction can help practitioners to seek guidelines for building

conducive learning environment and designing effective learning activities (Chen & Caropreso, 2004; Ingram & Hathorn, 2004; Sorensen, 2004).

Among various classifications of personality traits, the Big-Five model has been frequently used for research studies exploring personality (Wiggins, 1996). It is considered to be ideal for use in a classroom environment (Howard & Howard, 2004). The Big-Five model is a hierarchical model of personality that categorizes human personality into five broad, empirically generated dimensions (Gosling et al., in press). These dimensions are extraversion, emotional stability, agreeableness, conscientiousness, and openness (Barrick & Mount, 1991).

1. Extraversion: also called extraversion/introversion. Traits often associated with this dimension include being assertive, energetic, gregarious, active, sociable and talkative.
2. Emotional stability: also called neuroticism. Traits frequently associated with this domain include being anxious, emotional, insecure, depressed, angry, and worried.
3. Agreeableness: also called likability, friendliness, or social conformity. Common traits associated with this factor include being cooperative, flexible, forgiving, helpful, tolerant, and trusting.
4. Conscientiousness: also called conscience. Traits associated with this dimension include being dutiful, careful, organized, and hard-working.
5. Openness: also called openness to experience or culture. Traits often associated with this domain include being broad-minded, intelligent, imaginative, curious, creative, and non-conformist.

Table 2.2 shows the commonly associated characteristics of each dimension of Big-Five personality traits (Chen & Caropreso, 2004).

Table 2.2: The Big-Five Personality Traits

Dimension (Factor)	Low Score on Factor	High Score on Factor
Extraversion	Indifferent, quiet, reserved, serious, withdrawn	Energetic, fun-loving, sociable, talkative
Emotional Stability	Calm, relaxed, secure, stable	Emotional, insecure, worrying
Agreeableness	Manipulative, selfish, suspicious, uncooperative	Cooperative, friendly, helpful, trusting
Conscientiousness	Careless, lazy, negligent, unreliable	Dutiful, hard-working, methodical, organized
Openness	Conventional, down-to-earth, practical	Broad-minded, creative, nonconformist

Note: Adapted from (Chen & Caropreson, 2004) which was originally adapted from Ewn (1998, p. 140) and Saucier (2002, p. 13-15)

Learners with different personalities may prefer different ways to interact and may respond differently to various instructional activities. Based on both quantitative and qualitative data analysis of online collaboration and communication, Chen and Caropreson (2004) found that personality did affect learner communication type, pattern and task engagement. For instance, they found that students who were socially shy tended to prefer one-way communication in online discussions while extrovert students actively engaged in two-way communications. Moreover, Soles and Moller (2001) indicated that online instructors should consider the learner personalities related to their preferences for educational activities when designing online courses. They further suggested a number of online learning activities for learners who have different types of personality traits. For example, they suggested that instructors should provide more asynchronous and structured learning opportunities for introverted and sensing type learners since such learners prefer to reflect on their own and also like clear instructions.

Although there is lack of literature about how different personality type may affect learner preferences for interactions, it does not hurt to predict the direction of associations among these variables. Extroverts are more energetic and sociable and it is reasonable to assume that such learners like to communication with others. Therefore, the extrovert trait might be positively correlated with preferences for learner-instructor and learner-learner interactions while introvert trait may positively associated with preferences for learner-self interactions.

Encouraged by Soles and Moller's work, the current study aims to investigate the effects of personality on learner preferences for teaching and learning activities that can promote online interactions. The ultimate goal of the study is to seek guidelines for online course design issues that accommodate individual needs by taking such differences into consideration.

Other attributes

Marital condition and job status are other two learner attributes that the current study concerns. These two learner attributes are rarely studied in the past. As the result, there is lack of empirical evidence in literature that shows relationships between marital status and learner preferences for class interactions, and between job status and learner preferences for class interactions. Given the fact that family and work responsibilities often compete with study time, it is reasonable to assume that how much interaction a learner wants is affected by one's marital and job status.

Chapter summary

A review of the literature relative to online interaction has been provided in this chapter, including the development of online education in general, relevant theories, and the

importance of interaction in online education. Interaction, in this study, is defined as a reciprocal event that engages participants in conscious cognitive activities that contribute to learning outcomes. It emphasizes mutual influences of parties involved and it is different from the concept of interactivity, which is an attribute of instructional delivery system. Six types of online interaction have been presented from the literature review, leading to a new categorization scheme for interaction that is generated to meet the operational definition of interaction in this study: learner-instructor, learner-learner, and learner-self. Corresponding instructional activities are synthesized from various sources and presented under each type of interaction. Finally, relevant learner attributes are discussed to provide logical support for studying the possible relationships between individual differences and learner preferences for instructional activities.

This chapter demonstrated the importance of interaction and possible variables that are associated with learner preferences in relation to the learning process and learning outcomes. A big picture of what is discussed in this chapter can be summarized by a new model that shows the importance of interaction and its promotion process in online learning environment as shown in figure 1:

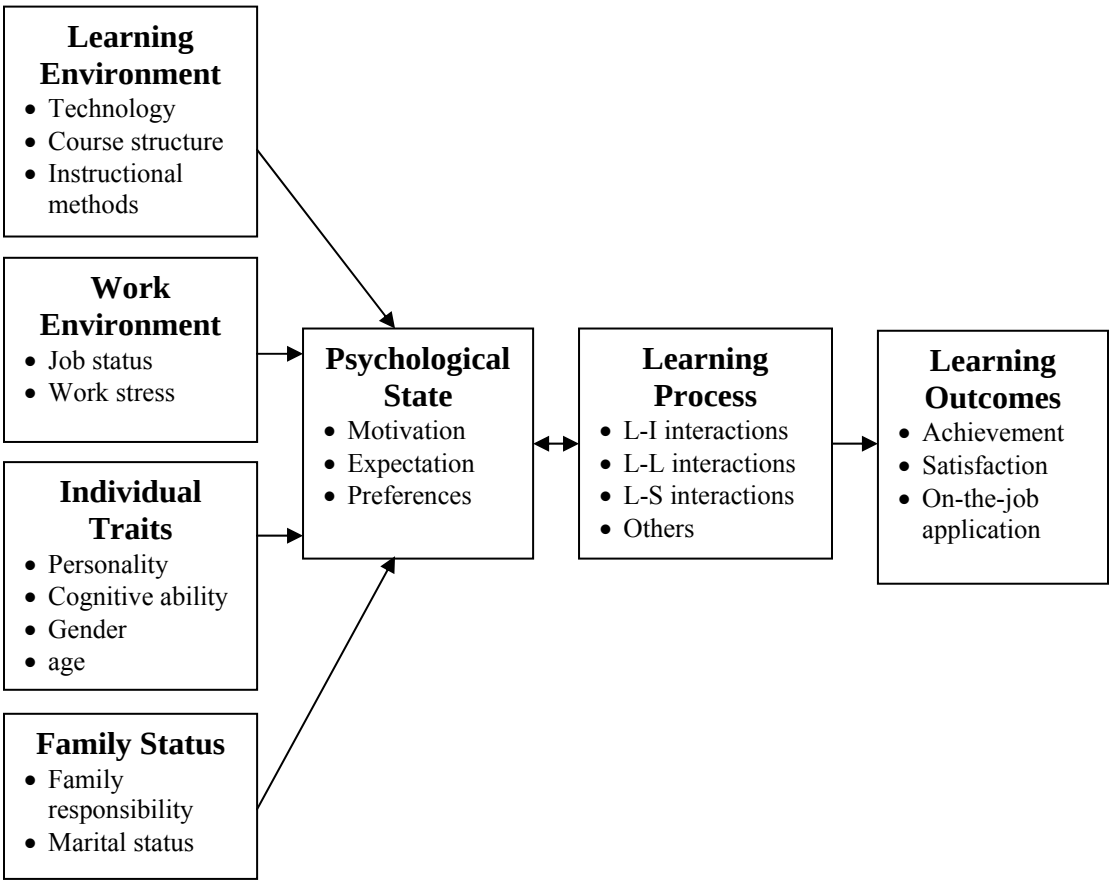


Figure 1: Possible constructs associated with learner preferences for interactions

Chapter Three: Methodology

Research questions

The research questions of the current study are listed below:

Q1: What instructional activities are used to promote online course interactions?

1.1: What instructional activities are used to enhance learner-instructor interaction?

1.2: What instructional activities are used to enhance learner-learner interaction?

1.3: What instructional activities are used to enhance learner-self interaction?

Q2: What are the learner preferences for online interactive instructional activities?

2.1: Are there general preferences toward certain instructional activities?

2.2: Are these preferences related to the types of interaction?

Q3: Is there a relationship between learners' gender, age, online experience, marital status, job status, or personality and their preferences for online course interactions?

3.1: Do learner preferences differ between male and female learners?

3.2: Is there a relationship between learner preferences and learner age?

3.3: Is there a relationship between learner preferences and learner prior online experience?

3.4: Do learner preferences differ among learners who are married and raising children, married with no children, single parents, or single?

3.5: Do learner preferences differ among learners who work full-time, part-time, or are unemployed?

3.6: Is there a relationship between learner preferences and individual personality traits?

3.7: How much variance within the learner preferences can be explained by gender, age, online experience, marital status, job status, and personality traits?

Q4*: Why do learners prefer some instructional activities over others?

4.1: What are the possible reasons that learners prefer certain instructional activities? Are there any reasons that are not related to demographic and personality traits? If so, what are they?

4.2: Are there any other instructional activities that learners prefer to have in an enhanced interactive learning?

Participants

Expert reviewers: Ten experts who had extensive online teaching experience were invited to review the set of instructional activities, which was summarized from a broad review of relevant literature. Five experts responded and provided feedback on which activities were supposed to promote which type of interactions.

Pilot study participants: A total of 50 online students in the department of Instructional Systems Technology at Indiana University were asked to participate in the pilot study. Out of this sample, 23 students responded, providing a response rate of 46%. Each of these students had taken at least one online course before.

Main survey participants: Kelley Direct Online MBA students and alumni were invited to participate in the study. The Kelley Direct online program is designed for

* A complete list of interview questions was generated based on the survey results and can be found in Appendix-A.

professionals who want to continue their employment while earning graduate degrees or certificates. It is the only graduate management program offered by a Top 20-business school that is delivered almost exclusively over the Web. In just a few years, the program has grown to include 1,000 students and offers over 70 online courses.

The final survey was distributed to a total of 463 online MBA students and alumni, including 148 first year students, 92 second year students, 124 students who were finishing up the last course of the program, and 99 alumni. A total number of 191 students responded to the online survey and the response rate was 41.3%.

Follow up interview participants: Survey respondents who were willing to participate in the follow-up interview were asked to provide an e-mail address when filling out the survey. From among these volunteers, 11 students were selected for a 45-minute one-on-one telephone interview.

Instrument development

A total of 32 instructional activities that promote online interaction were first synthesized from the literature, and then revised through expert reviews to increase their content validity. These survey items were further refined through a pilot study. To collect both learner preferences and learner experiences of online interaction activities, each survey item was asked twice in different formats. The questions about learner experiences of online interaction activities would help determine which instructional activities were employed to promote online interactions (the first research question). The second set of survey questions would collect learner preferences for these instructional activities in order to answer the second and third research questions. Student demographic information questions and a ten-item personality measure (TIPI) were also included in the survey. The follow-up interview

questions were generated later based on the survey results. Main interview questions were reviewed by experts to make sure that they were on target. Further attention was paid to avoid leading questions and to avoid abstract questions that might confuse the interviewees.

Personality literature shows that the most comprehensive personality instrument, the NEO Personality Inventory, has 240 items and requires about 45 minutes to complete (Costa & McCrae, 1992). A shorter version of the widely-used Big-Five personality measure is the 44-item Big Five Inventory (BFI). For the purposes of this study, even the BFI seems too long. Fortunately, Gosling, Rentfrow, and Swann (in press) recently proposed TIPI, a validated ten-item measure of the big five personality dimensions, which is recommended when time and space are limited. They conducted two studies to compare the validity and reliability of the five-item (FIPI), ten-item (TIPI), and BFI personality instruments. The first study was based on 1,704 subjects and the second one had 1,813 subjects. Results showed that both FIPI and TIPI, although slightly inferior to the BFI, still showed a satisfactory level of convergent and discriminant validity, test-rest reliability, and patterns of external correlates. The researchers concluded that "these very brief instruments can stand as reasonable proxies for longer Big-Five instruments, especially when research conditions dictate that a very short measure be used. Of the two instruments, the ten-item instrument is psychometrically superior, it can be used for latent variable modeling, it allows researcher to assess for acquiescence bias and check for errors, and it takes no longer to complete than the five-item instrument." Therefore, the ten-item measure will be adopted for the purposes of this study.

Expert Review

The expert review helped cut down the number of interactive instructional activities from 32 items to 28 items. Some of the items were checked for promoting multiple types of interactions. If an activity was considered by two or more experts as "not relevant," it was removed from the list. If an activity checked under one type of interaction by four or five experts while also checked in other types by one or two experts, it was re-worded to minimize the contaminant effect. If a new activity was recommended by two or more experts, it was added to the list.

Table 3.1: Expert review results

Instructional activities to promote online interactions	**L-I**	**L-L**	**L-Self**	**Not Relevant**
1. Instructor-led synchronous lectures that allow real-time questioning	5x			
2. Student archived discussions in the online forums.			5x	
3. Team-based collaborations.		5x		
4. Instructor participation in group-level discussions.	4x	x		
5. Make the quality of student discussions an assessment criterion.		3x	x	x
6. Student reflection on what he/she has learned.			5x	
7. Instructor providing questions to push students to explore more deeply.	x		x	2x
8. Online debate team activities *among students*.	x	5x	x	
9. Students writing critiques or reflection papers about key course topics or concepts.			5x	
10. Instructor setting clear expectations for student participation in class discussions.	3x	x		x
11. Students sharing course-related information and resources among peers.		5x		
12. Online guest experts giving lectures and communicating with students once in a while.	4x	x		x
13. Students evaluating instructor teaching practice.	4x	x		x
14. Individual problem-solving opportunities such as responding to questions independently.			4x	x
15. Class-level large group asynchronous discussions *among*	2x	4x	x	

students.				
	L-I	**L-L**	**L-Self**	**Not Relevant**
16. Synchronous chat sessions to engage in real-time discussions among students.		4x		
17. Instructor virtual office hours for individual real-time consultation.	5x		x	
18. Utilizing roles (such as team leader, reporter, etc) during teamwork. *(making individuals responsible for certain task role during teamwork)?*		3x	2x	x
19. Grading student responses to instructor-initiated questions.	4x	x	x	
20. Online role-playing activities (e.g., playing different roles in a case).		5x	x	
21. Students giving feedback to each other.		5x		
22. Instructor informal social communication with students.	4x			x
23. Students engaging in informal chats among themselves where they share experiences and beliefs etc.		5x	x	
24. Instructor participation in class-level discussions.	5x			
25. Make the quantity of student discussions an assessment criterion.	x	2x		3x
26. Checking on student progress regularly to see how they are doing *(e.g., reading student academic journals and giving feedback).*	3x			2x
27. Instructor-led asynchronous lectures (e.g., post-lecture notes, Power Point slides, etc., online) that involve delayed questioning and responding.	5x			
28. Students preparing questions for next class or academic topic.			4x	x
29. Group *level* asynchronous discussions *among students*.	X	5x		
30. Students summarizing their "take away" or key points of major topics or discussions for his/her later use.			5x	
31. Prompt feedback from instructors.	5x			
32. Students keeping an electronic study journal (weekly entries in a personal blog)			2R	
33. Student collaboratively writing documents/reports		2R		

(R: additional items that are recommended by experts.)

This part of the study not only provided content and face validity to the interactive instructional activity list, but also facilitated the formulation of student survey items. The

student questionnaire for the pilot study was developed based on this expert review (See Appendix-B and -C).

Pilot Test of the Instrument

A pilot test was conducted a few weeks prior to the full study to verify the internal reliability of the instrument, to test the research procedures, and to make necessary revisions before full implementation of the study. In order to avoid asking online MBA students to respond to the same questionnaire twice, the subjects recruited for the pilot test were from a distance master's program in the School of Education at the same university. These distance students had completed at least one online course at the time of pilot study. A total number of 50 students were asked to participate in the pilot study; as indicated earlier 23 (46 percent) completed the online survey.

An exploratory analysis of data collected during the pilot study was conducted to examine the reliability of the sub-scales of the research instrument. A summary of the internal reliabilities of each scale is reported in Table 3.2. The demographic data and the personality scales were not analyzed because they were either not applicable to run the internal reliability analysis or were already validated in the literature.

Table 3.2: Internal reliability of the survey scales

Scale	Cronbach's Alpha	Cronbach's Alpha excluding missing data
Interactive Instructional Activity Experience	0.76	0.80
Interactive Instructional Activity Preference	0.89	0.89
Preferences for Learner-Instructor Interaction	0.37	0.42
Preferences for Learner-Learner Interaction	0.78	0.78
Preferences for Learner-Self Interaction	0.85	0.86

Among all the newly constructed scales, preferences for learner-instructor interaction was of primary concern to the researcher (alpha=.42). Close examination of this section revealed two possible explanations:

- Two out of the nine questions did not show much variability. The frequency of response choices for question 5, "my online instructors should participate in class-level discussions," and question 8, "my online instructors should provide prompt feedback" clustered in the two highest ratings. Such low variability contributed to the low reliability of this sub-scale.
- Feedback from several respondents showed that there were three poorly worded items in this section that confused them. For instance, "my online instructors should have virtual office hours for individual real-time consultation" seemed ambiguous to subjects. They did not seem to understand what "virtual office hours" meant or how it might work. Three poorly worded items resulted in negative inter-item correlations with several other items in this sub-scale, thus, inevitably lowering the reliability of the scale.

By excluding the abovementioned problematic question items from the scale, the alpha level increased to 0.70, which is a more acceptable reliability score. Since the pilot study only had 23 responses, it was decided not to delete any survey questions at this stage, but to re-word some of the items to make them clearer and more consistent with the rest. At the same time, these problematic questions could be removed or deleted if the same pattern held true in the main study.

Lessons Learned from the Pilot Study

The first concern raised from the pilot study was the missing data. Several students missed or avoided answering certain questions. In order to eliminate this phenomenon in the main study, the survey was programmed so that it would remind respondents to answer any questions that were missed or skipped at first.

A second issue identified by the pilot study was the opaque wording of certain questions. The open-ended question results showed that some subjects did not understand the wording of certain questions. For instance, a respondent said that instructors should "provide an occasional online or phone consultation" even though a similar interactive activity—"have virtual office hours for individual real-time consultation"—had already been provided. This response indicated that this respondent failed to understand what virtual office hours really meant. In this case, examples were given after the statement to help participants understand what the question was about. Some respondents pointed out that they did not like the wording "my online instructors need to" or "my online instructors should" etc. In this case, these items were re-worded as "I hope my online instructors will…" in order to reflect that the intention of questions was to examine student preferences, not to judge instructor behaviors. Similar kinds of re-wording were undertaken on several occasions to make the survey more intelligible to the respondents.

The third issue determined from the pilot test was the low reliability of the learner-instructor interactive activity section. Low item variability on certain items and negative inter-item correlations among certain questions contributed to a low internal reliability of this sub-scale. It was not clear whether the negative inter-item correlations were solely due to the poor wording and ambiguity of the questions or perhaps due to multi-dimensional sub-constructs within this section. For example, it is possible that online students only prefer

academically oriented learner-instructor interactions, but do not really care about the interaction activities that enhance social binding of the learner and instructor. If this scenario is accurate, then this sub-scale contains at least two dimensions of learner-instructor interaction activities: academically oriented and socially oriented activities. Since there were only 23 responses, it was not possible to run factor analysis to determine whether there were underlying sub-dimensions within this section. Therefore, problematic items were re-worded for the sake of clarity. When the same problematic patterns existed in the final study, however, these items were removed.

Survey Data Collection

A total number of 463 online MBA students and alumni were asked to fill out the online questionnaire. The questionnaire data was collected on four separate occasions. Students who were enrolled in the last semester of their online MBA program were contacted in June 2005. The instructors were extremely supportive and the survey information was announced on their course management system for two weeks. After the two week announcement, a reminder was sent to students' course email accounts in the course management system. A total of 52 out of 124 students replied.

E-mail addresses of alumni were obtained through the external relations and student coordinator of the program in late June 2005. A description asking alumni to respond to the online survey was sent to all alumni by e-mail. A dozen email addresses were out-of-date and thus immediately bounced back to the researcher. Twenty one out of 99 alumni (the number excluding those bounced) filled out the survey.

First year online MBA students were contacted in mid-October. With the instructor's permission, the survey information was announced in their course management system for

ten days. After that a reminder was sent to student course email accounts asking additional students to participate in the study. In the end, 60 out of 148 students replied.

Second year online MBA students were also contacted in mid-October. The course instructor sent out a message to student course email accounts in the course management system asking them to respond to the survey. The survey remained open to these students for three weeks. A total of 58 out of 92 students replied to the survey.

Student IP numbers and time stamps were collected to identify duplicate or corrected responses, where the participant either clicked the *Submit* button multiple times or used the *Back* button of browser to correct something after completion. A total of five cases were identified as duplicates. The response with the latest time stamp was believed to be the most accurate and was included in the final data set. After removing all the duplicate cases, a total of 191 records were stored for final data collection. The final survey respond rate was 41.3%. Qualitative (open-ended) and quantitative data were automatically stored in two separate files for the convenience of analyzing them later.

Interview Data Collection

Among the survey respondents who provided email addresses, 11 currently enrolled online students were selected for individual interviews. Based on the survey results, the researcher tried to select students whose key individual characteristics such as age, having children or not, and prior online experiences could reflect the key independent variables of the study. Students were grouped by these key variables first to make sure the final sample included enough variations including both old and young learners, plenty of experienced online students, and learners who were raising children or no children, etc.

The 11 selected students were contacte d via e-mail. When someone expressed no interest to participate in the study, another student who had similar key characteristics was added in the contact pool until there were 11 people who agreed to participate in the telephone interviews. The length of individual interviews ranged from 35 -50 minutes. The phone conversations were recorded on a digital recorder and fully transcribed later.

A total of 20 questions were asked during interviews (see Appendix A). These questions were generated after the survey analysis to answer the last research question of say on "why online students preferred certain interactive activities over other?" When a survey finding needed further explanation, a corresponding interview question was generated to find out the underlying reasons to explain the phenomenon. For example, the survey results determined that online students did not prefer to have class level large group discussions although it was used frequently in practice. In order to find out the reasons of low preference toward class level discussion, the third interview question was asked to find out the reasons as well as to receive suggestions for further improvement. The final interview questions were reviewed and further revised by two experts in the field to make sure that they addressed the issues emerging from the survey findings and were also appropriate to ask the online students.

Data analysis methods

Survey analysis

SPSS 13.0 and SAS 9.13 software packages were used to analyze the quantitative data. The statistical procedures utilized in this research were: Cronbach's Alpha (to report internal consistency reliability of sub-scales), descriptive statistics (to report learner experiences and preferences for instructional activities), one-way ANOVA and Scheffe post-

hoc test (to compare mean preference differences between gender, and among marital and job status), Pearson product moment correlations (to examine possible relationships between student preferences and continuous variables), item-level comparisons with Bonferroni correction (to reduce the chance of making Type I error for multiple comparisons), exploratory factor analyses (for data reduction of each type of interaction and to identify underlying dimensions of each type of interaction), within subject repeated measure ANOVA (to determine whether student preferences differ significantly among three types of interactions), and multiple regression analyses (to determine how much variance can be explained by all IVs).

The open-ended question was combined into one text file. I carefully read through the file several times looking for comments or answers to questions that directly related to the major issues or themes of this particular study. Similar comments and suggestions were grouped first under each type of interaction. Then a summary phrase was used to synthesize each main point. These main points were considered and blended into the survey discussion sections to provide evidence and support for the survey conclusions.

Interview analysis

The interview data was recorded into digital audio files and transcribed before analyses. Patton (1990) pointed out that the constant comparison method could be used to analyze different perspectives on the questions by cross-case groupings of answers. Since the current study consisted of multiple interviews of different individuals with the same set of questions, the constant comparative method was used for the cross-case analysis to summarize emerging themes. Basically, I coded the raw data categorically by looking at all 11 answers to each question. In each question, answers were grouped and summarized into a

few coding schemes. A peer researcher was invited to code one of the questions to provide investigator triangulation. On this co-coded question, we had five out of six schemes were consistent and generated high level of similarity. Although highly consistent coding on one question could not represent similarity of coding in all 20 interview questions, it is simply impossible to ask anyone to work on the entire set of interview data. The argument was that this researcher had a very similar educational background and work experience to the main researcher, and it is assumed that she would interpret responses to all other questions in a similar manner.

Chapter summary

This chapter outlined the methodology used for this dissertation study. Specific research questions, the development process of the research instrument, the efforts undertaken to improve instrument validity and reliability, and the data collection and analysis methods were explained in detail in this chapter.

Chapter Four: Results

Using a 71-item Web-based survey, this study collected data on learner experiences and preferences towards a number of interactive instructional activities in online learning environment as well as a number of learner individual characteristics (gender, age, work status, marital status, previously taken online courses, and personality traits). The survey was sent to a total number of 463 online MBA students and alumni. The data collection took five months from June to November in 2005, with 191 individuals completing the online survey, and yielded a return rate of 41.3%. Three cases out of these 191 were deleted because they were identified as invalid entries or outliers. Two univariate outliers were Case 73 and Case 93. Asked to provide learner age, Subject 73 entered "100," which we know was incorrect. Subject 93 reported that she/he took 60 prior online courses, a number far higher than the second highest number (30 courses), and thus resulted in a very large standardized score of 6.61. According to Tabachnick and Fidell (2001), cases with standardized scores in excess of 3.29 are potential outliers. Case 118 was identified as a multivariate outlier due to its large standardized score for most items. This case is further confirmed as an outlier from the residual plot. Therefore, these three cases were eliminated from the data set, so the final statistics were analyzed on a basis of 188 cases.

This chapter reports the respondents' demographic data and addresses Research Questions 1, 2, and 3, in that order. A number of interview questions were generated based on the survey results for the next round of data collection to answer Research Question 4 (in next chapter).

Participant's Demographic Information

In the current sample, about three quarters of the survey respondents were male. Specifically, among 188 final participants, 25.5% were female and 74.5% were male. The sample was representative of this online program by gender since Chi-square analysis between the sample and the expected value* did not show a statistically significant difference.

Table 4.1: Gender Descriptics

Gender	Frequency	Expected
Female	48	37.6
Male	140	150.4
X^2=3.596, p=.058>.05		

Age of participants ranged from 21 to 61 with mean age of 33.

Table 4.2: Age Descriptics

Age	N	Minimum	Maximum	Mean	Median	Mode	Std. Deviation
Age	188	21	61	32.80	31	27	6.7459

Nearly 80% of the participants were married. Exactly 45.7% of the participants were married and raising children, 33.5% were married with no children, 20.2% were single, and only one person (0.5%) reported as single-parent.

Table 4.3: Marital Status Descriptics

Marital Status	Frequency	Percent
Married & raising children	86	45.7
Married & no children	63	33.5
Single parent	1	.5
Single	38	20.2
Total	188	100.0

The results showed that 95.2% of the participants had full-time job, 1.1% worked part-time, and 3.7% reported as not currently employed.

* institutional data on gender revealed that 20% of the student population of this online program was female.

Table 4.4: Age Descriptics

Work Status	Frequency	Percent
Work full-time	179	95.2
Work part-time	2	1.1
Not employed	7	3.7
Total	188	100.0

Most of the participants had taken one or more online courses prior to the online course in which they are currently enrolled. Only 5.3% reported the current course was the first online course in which they were enrolled. The average number of prior online courses taken were 9.

Table 4.5: Prior Taken Online Courses Descriptics

Prior online courses taken	Frequency	Percent	Prior online courses taken	Frequency	Percent
0	10	5.3	13	6	3.2
1	3	1.6	14	13	6.9
2	38	20.2	15	14	7.4
3	11	5.9	16	14	7.4
4	1	.5	17	8	4.3
5	5	2.7	18	4	2.1
6	9	4.8	20	1	.5
7	9	4.8	23	1	.5
8	1	.5	24	1	.5
9	9	4.8	26	1	.5
10	14	7.4	27	1	.5
11	7	3.7	30	3	1.6
12	4	2.1	Total	188	100.0

To examine possible association between learner personality and learner preferences for online interactions, a ten-item validated personality inventory was embedded into the online survey. It measures “big five” personality traits, which include extraversion, agreeableness, conscientious, emotional stability, and openness to experience. The survey results indicated that most of the participants were moderately high on all five dimensions of personality as show in the table below.

Table 4.6: Personality Traits Descriptics

Personality traits	N	Minimum	Maximum	Mean	Std. Deviation
Extraversion	188	1.50	7.00	4.80	1.40
Agreeableness	188	1.50	7.00	4.87	1.21
Conscientious	188	2.50	7.00	6.01	1.01
Emotional stability	188	1.50	7.00	5.61	1.08
Openness to experience	188	2.50	7.00	5.57	.95

Research Question 1: Learner experiences about online interactive activities

The first research question is, "Which instructional activities are used to promote online course interactions?" In particular, there are three sub-questions asking which instructional activities are used for learner-instructor, learner-learner, and learner-self interactions. To answer these questions, a mean rating on each instructional activity was calculated and the activities in each type of interaction were ranked based on the mean rating scores. A five-point scale ("never=1," "rarely=2," "sometimes=3," "often=4," and "always=5") provided the possible answers to these questions.

Q1.1: Learner-Instructor interaction activities

Among a number of activities, prompt feedback was viewed as the most commonly used learner-instructor interaction activity (M=4.05). As shown in the Table below, asynchronous lectures* (M=3.93), instructor participation in class discussions (M=3.67), and grading on student responses to discussion questions (M=3.59) were also used considerably. Checking on student progress (M=3.17), the instructor participating in group-level discussions (M=3.11), and socializing online with students (M=3.03) were utilized only sometimes. Synchronous lectures were rarely used online (M=2.65).

Table 4.7: Descriptics of experiences of learner-instructor interaction activities

* Asynchronous lectures in this study particularly point to those involve delayed questioning and responding. E.g., post lecture notes, video, power point slides etc. online.

Learner-Instructor interaction activities	Mean
Prompt feedback	4.05
Asynchronous lectures	3.93
Instructor participate in class-level discussions	3.67
Regular office hours for consultation	3.59
Grade on student responses to discussion questions	3.54
Check on student progress regularly	3.17
Participate in group-level team discussions	3.11
Social communication with students	3.03
Synchronous lectures	2.65

Q1.2: Learner-Learner interaction activities

Using team-based collaborative projects and assignments was the most frequently used activity that could promote learner-learner interactions (M=4.39). Asynchronous discussions at the group-level (M=3.80) and at the class-level (M=3.42), sharing course related information and resources (M=3.69), informally chatting with fellow students (M=3.37), and providing feedback to each other (M=3.14) were the next most commonly used methods that could promote learner-learner interaction. Those activities that would involve instructor participation or assignment of learner roles, such as online debating teams (M=2.39) and role-playing in a case (M=2.18), were rarely used in the online environment.

Table 4.8: Descriptics of experiences of learner-learner interaction activities

Learner-Learner interaction activities	Mean
Team-based collaborative projects and assignments	4.39
Small group asynchronous discussions	3.80
Share course-related information and resources with my peers	3.69
Class-level large group asynchronous discussions	3.42
Have informal chats with peers	3.37
Synchronous chat sessions for students	3.14
Give feedback to my peers	3.08
Get feedback from my peers	3.03
Utilize task roles (such as discussion moderator, team leader)	2.43
Student online debating team activities	2.39
Online role-playing activities (e.g., playing different roles in a case)	2.18

Q1.3: Learner-Self interaction activities

Reading each other's online postings (M=3.72), applying what is learned in real life situations (M=3.71), and solving problems independently (M=3.5) were used fairly often in online learning to promote learner-self interactions. Reflecting on what was learned (M=3.34), summarizing "take away" key points (M=3.34), preparing questions before class (M=2.93), and writing critiques (M=2.80) were utilized sometimes in online learning. An electronic study journal (M=1.62) was rarely used.

Table 4.9: Descriptics of experiences of learner-self interaction activities

Learner-self interaction activities	Mean
Read over each other's discussions in the online forums	3.72
Apply what have learned in real life situations	3.71
Be given individual problem-solving opportunities such as responding to questions independently	3.50
Reflect regularly on what have learned	3.34
Summarize "take away" key points of major topics or discussions	3.34
Prepare questions before the next class or academic topic	2.93
Write critiques or reflection papers about key course topics or concepts	2.80
Keep an electronic study journal	1.62

In summary, online interactions happen primarily through team-based collaborative tasks, prompt feedback from instructors, asynchronous lectures, asynchronous discussions, sharing resources with peers, and regular office hour consultations. Anything requiring synchronous involvement or taking roles in class activity is not currently used much in online learning. Learner self-reflection on the subject matter happens mostly through reading discussions, using what has been learned in real life situations, and in responding to questions independently. Unlike many face-to-face students, online learners do not usually "come to class" with questions prepared.

Research Question 2: Learner preferences about online interactive activities

RQ2.1: Are there general preferences toward certain instructional activities?

The analysis of this question was broken into three parts to address preferences for interactive activities in each type of interaction: (a.) learner preferences for learner-instructor interaction activities, (b.) learner preferences for learner-learner interaction activities, and (c.) learner preferences for learner-self interactions activities.

Preferences for learner-instructor interaction activities: To rank the preferences for learner-instructor interaction activities, the mean score of each learner-instructor interaction activity was calculated and ranked in descending order. The responses for these questions were given on a five-point Likert type scale from "strongly disagree" to "strongly agree." An internal reliability analysis of this sub-scale returned alpha coefficients of .62. A closer look at the data set revealed that the relatively low internal reliability of this sub-scale was due to negatively correlated items and small variability in the answers. A Pearson correlation analysis showed that Item 1, "I prefer my online instructors use asynchronous lectures," and Item 2, "I prefer my online instructors use synchronous lectures," were negatively correlated ($r=.274$, $p=.000<.05$). Removing these two items would increase the alpha to .67.

The results revealed that the most preferred learner-instructor interaction activity was for instructors to provide prompt feedback to learners ($M=4.65$). Asynchronous lectures, checking student progress regularly, instructors participating in class-level discussions, and regular office hours for consultation were the next most preferred learner-instructor interaction activities that had mean ratings of above 4.00 on a 5-point Likert scale. Instructor participation within group-level discussions, the grading of student responses to discussion questions, and instructors communicating with students socially were considered to be somewhat preferred, with mean ratings between 3.75 to 4.00. Synchronous lectures was the least preferred by online learners ($M=3.36$).

Table 4.10: Descriptics of preferences for learner-instructor interaction activities

Learner-Instructor interaction activities	Mean
Provide prompt feedback	4.65
Use asynchronous lectures	4.35
Check student progress regularly	4.18
Participate in class-level discussions	4.18
Have regular office hours for consultation	4.01
Participate in group-level team discussions	3.87
Grade student responses to discussion questions	3.79
Have social communication with students	3.76
Use synchronous lectures	3.36

Preferences for learner-learner interaction activities: Similar to analyzing learner-instructor interaction activities, a mean score of each learner-learner interaction activity was calculated and ranked in descending order. An internal reliability analysis of learner-learner interaction scale returned alpha coefficients of .77.

Among eleven learner-learner interaction activities, online learners most preferred to share course-related information and resources with peers (M=4.30). Team-based collaboration (M=4.26), informal chats with peers (M=4.14), and small group asynchronous discussions with peers (M=4.10) were the next most preferred learner-learner interaction activities, each receiving mean ratings above 4 on a 5-point Likert scale. Online role-playing activities, online debating team activities, and assigning task roles were the three least preferred items on the list.

Table 4.11: Descriptics of preferences of learner-learner interaction activities

Learner-Learner interaction activities	Mean
Share course-related information and resources with my peers	4.30
Have team-based collaborative projects and assignments	4.26
Have informal chats with peers where we share experiences and beliefs, etc.	4.14
Have small group asynchronous discussions among students	4.10
Get feedback from my peers	3.96
Give feedback to my peers	3.95
Have synchronous chat sessions for students to engage in "real-time" Discussions	3.63

Have class-level large group asynchronous discussions	3.54
Have online role-playing activities	3.47
Have student online debating team activities	3.39
Utilize task roles	3.30

Preferences for learner-self interaction activities: The mean score of each learner-self interaction activity was calculated and ranked in descending order. An internal reliability analysis of learner-self interaction sub scale returned alpha coefficients of .74.

Among the eight learner-self interaction activities, online learners most preferred to use what they had learned in real life situations (M=4.62). Reflecting on what they had learned, summarizing key points of major topics/discussions, having opportunities to solve problems individually, and reading other's forum postings were next most preferred learner-self interaction activities. Online learners generally did not want to keep an electronic study journal. The mean rating on this item was lower than 3 on a 5-point Likert type scale (M=2.51).

Table 4.12: Descriptics of preferences of learner-self interaction activities

Learner-Self interaction activities	Mean
Utilize what we have learned in real life situations	4.62
Reflect on what we have learned	4.15
Summarize take away key points of major topics or discussions	4.14
Be given individual problem-solving opportunities, such as responding to questions individually.	4.13
Read over other's discussions (both on-going and archived discussions) in the online forums	4.03
Prepare questions before the next class or academic topic	3.60
Write critiques or reflection papers about key course topics or concepts	3.43
Keep an electronic study journal	2.51

In summary, online learners prefer receiving prompt feedback, participating in asynchronous lectures and discussions, sharing resources and experiences with peers, and participating in team-based task collaborations. It is interesting to note that, although the questions about experiences revealed that informal chats among learners only happen

sometimes, learners preferred to have informal chats with peers more than to engage in class discussions and getting/giving feedback to each other. Another important finding was that learner preferences toward class-level asynchronous discussion had ranked much lower even though this activity was used quite often in online learning. Regarding learner-self interactions, online learner preferences for reading each other's discussions ranked much lower than others although it was the most frequently used instructional activity that promotes learner-self interaction.

RQ2.2: Are these preferences related to the types of interaction?

To answer this question, new variables that could represent student preferences for each type of interaction needed to be created first. It is important to note that the survey used in this dissertation was created based on expert review only, and thus was not a fully validated measure. A factorial analysis was needed to determine whether the survey items in each section could represent the learner-instructor, learner-learner, and learner-self constructs adequately. In this survey, there were 9 learner-instructor, 11 learner-learner, and 8 learner-self interactive activities. An exploratory factor analysis with principal axis extraction was applied to each type of interaction to determine how many component(s) accounted for the items in each section.

Factor analysis of learner-instructor interaction: The factor analysis results indicated that the learner-instructor interaction activities loaded on one factor, five out of the nine items in learner-instructor interaction had loading weight above .40 (see Table 4.13 below).

Table 4.13: Factor analysis of learner-instructor interaction activities

	Factor
	1
Instructor participate in group-level team discussions	**.624**
Instructor having social communication with students	**.578**

Checking student progress regularly	**.548**
Grading student responses to discussion questions	**.508**
Instructor participation in class-level discussions	**.421**
Provide prompt feedback	.351
Have regular office hours for consultation	.299
Use synchronous lectures	.290
Use asynchronous lectures	-.012

Factor analysis of learner-learner interaction: Learner-learner interaction had ten out of eleven items loaded above .40 when the number of factor extraction was forced to load on one factor (see Table 4.14 below).

Table 4.14: Factor analysis of learner-learner interaction activities

	Factor 1
Share course-related information and resources with my peers	**.704**
Get feedback from my peers	**.697**
Give feedback to my peers	**.673**
Have informal chats with peers where we share experiences and beliefs, etc.	**.640**
Have student online debating team activities	**.576**
Have team-based collaborative projects and assignments	**.544**
Utilize task roles for individual students	**.537**
Have online role-playing activities	**.523**
Have class-level large group asynchronous discussions	**.466**
Have small group asynchronous discussions among students	**.439**
Have synchronous chat sessions for students to engage in "real-time"	.241

When an eigan value greater than one was employed as the loading criterion, these items loaded on three factors, as shown in Table 4.15. This indicates that there are three sub-dimensions in the larger construct of learner-learner interaction.

Table 4.15: Factor analysis of learner-learner interaction activity sub-dimensions

	Factor 1	Factor 2	Factor 2
Get feedback from my peers	**.949**	.046	-.009
Give feedback to my peers	**.933**	.042	-.030
Share course-related information and resources with my peers	**.696**	.101	.346
Have informal chats with peers where we share experiences and beliefs, etc.	**.540**	.142	.386
Have online role-playing activities	.017	**.863**	.100
Utilize task roles for individual students (e.g, coordinator)	.151	**.795**	-.007

Have student online debating team activities	.014	**.761**	.347
Have small-group asynchronous discussions among students	.008	-.006	**.805**
Have class-level large-group asynchronous discussions	.132	.218	**.591**
Have team-based collaborative projects and assignments	.262	.338	**.396**

The first component, concerning sharing information and resources with peers, was named "sharing information." It included activities like getting and giving feedback to each other, the sharing of course-related resources, and having informal discussions to share experiences and thoughts with peers. The second component, emphasizing individual roles in class participation, was named "taking roles in class activities." It included activities such as role-playing, online debating, and role assignment. The third component, concerning class discussions and task collaboration, was named "engaging in discussions and collaborations." It included activities such as small- and large-group discussions, and team collaboration on assignments.

Table 4.16: Sub-dimensions of learner-learner interaction

Sub dimensions of learner-learner interaction
Sharing information
Taking roles in class activities
Engaging in discussions and collaborations

Factor analysis of learner-self interaction: Learner-self interaction loaded on one factor, specifically 7 out of the 8 items in learner-self interaction had loading weight above .40 (see Table 4.17).

Table 4.17: Factor analysis of learner-self interaction activities

	Factor 1
Prepare questions before the next class or academic topic	**.594**
Summarize "take away" key points of major topics or discussions	**.577**
Write critiques or reflection papers about key course topics or concepts	**.575**
Reflect on what we have learned	**.568**
Keep an electronic study journal	**.502**

Be given individual problem-solving opportunities, such as responding to questions individually.	**.449**
Utilize what we have learned in real life situations	**.412**
Read over other's discussions (both on-going and archived discussions) in the online forums	.395

Learner preferences as related to types of interaction: To obtain student preference ratings on learner-instructor interaction activities, the sum of all loaded item scores was multiplied by the respective factorial weight and then divided by the sum of factorial weights. The mean of this new variable was 3.94, indicating that students typically preferred to have interaction with their instructors.

Table 4.18: Descriptics of preferences for learner-instructor interaction activities

Learner-instructor interaction	N	Mean	S.D.	Skewness	Kurtosis
	188	3.9415	.57451	-.129	-.288

Similar to generating the preference of learner-instructor interaction score, student preferences toward learner-learner interaction methods also used the factorial weight of each item to calculate the overall rating of this learner-learner interaction. The mean score for learner preferences for learner-learner interaction was 3.86, indicating a general preference for this type of interaction.

Table 4.19: Descriptics of preferences for learner-learner interaction activities

Learner-learner interaction	N	Mean	S.D.	Skewness	Kurtosis
	188	3.86	.48	-.025	.216

Preferences toward learner-self interaction had a mean of 3.76, also indicating a general preference for this type of interaction.

Table 4.20: Descriptics of preferences for learner-self interaction activities

Learner-self interaction	N	Mean	S.D.	Skewness	Kurtosis
	188	3.76	.48	.358	.243

To determine whether online learners prefer certain types of interaction more than others, within-subject repeated measure ANOVA tests were conducted among learner preferences for learner-instructor, learner-learner, and learner-self interactions. As seen in Table 4.21, the preferences for the three types of interactions were statistically significant. The test of Sphericity shows the Sphericity assumption was not violated indicating the F-test is not biased. The descriptive statistics shows that learners most preferred to engage in learner-instructor interactions and least preferred to have learner-learner interactions. The level of practical significance was calculated using the partial Eta Square. Eta square values of .01, .06, and .14 have traditionally represented small, medium, and large effect sizes (Green, Salkind, & Akey, 1997). The current study yielded an effect size of .052, close to medium effect. Findings of moderate effect sizes, along with statistical significance contribute to the

practical significance of the results (Cohen, 1994; Hunter, 1997).

Table 4.21: SPSS results of within-subject tests

Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx Chi-Square	df	Sig.
Types of Interactions	.980	3.799	2	.150

Tests of Within-Subjects Effects

	Source	df	F	Sig.	Partial Eta Squared	Observed Power
Types of interactions	Greenhouse-Geisser	1.96	10.21	**.000**	.052	.986
Error	Greenhouse-Geisser	366.589				

Descriptive Statistics

	Mean	S.D.
Learner-instructor	3.942	.575
Learner-learner	3.859	.498
Learner-self	3.762	.481

Within learner-learner interaction, online learners most preferred to share information, next preferred to engage in discussions and collaborations, and lease prefer to have learner-self interactions (Table 4.22).

Table 4.22: Descriptics of preferences for sub-dimensions of learner-learner interactions

	Mean	S.D.
Sharing information	4.07	.59
Engaging in discussions and collaborations	3.95	.60
Taking roles in class activities	3.39	.82

In summary, online learners prefer to engage in all three types of interactions in general. However, their preferences for these interactions decline in the order of interacting with instructors, peers, and self. Within learner-learner interaction, online students most prefer to share information with peers, and next prefer to engage in discussion and collaboration. They least prefer to take roles in class activities such as moderating a discussion, playing an individual role in a case, and taking responsibility in a debating team.

Relative ranking difference between learner preferences and experiences of interactive instructional activities

To understand how well the current online practice is meeting student preferences, a comparison between online learner preferences and experiences of interactive instructional activities is conducted. It is important to note that learner preferences and experiences are rated on two different scales. Learner preferences are rated on "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree." Learner experiences are rated on "never," "rarely," "sometimes," "often," and "always." Therefore, the gap between learner preferences and experiences of each interactive activity does not have a direct meaning. The purpose of doing this analysis is to determine the relative differences among activity gaps to see which activities are meeting student preferences more compared

to others. This piece of information could help us understand which interactive activities can be increased in amount in order to better meet student needs in the future.

Within learner-instructor activities, online learner experiences of synchronous lectures, social communication with instructors, instructor participation in team discussions, and instructor checking on student progress do not seem to meet student preferences. The gaps of these particular activities are greater than the average gap of all activities in this section. This indicates that the current online program may want to add more synchronous components to its courses, encourage online instructors to have social communications with students and to participate in group level discussions, and monitor individual student progress more closely.

Table 4.23: Gap between preferences for and experiences of Learner-Instructor activities

Instructional activities for learner-instructor interaction	Preferences	Experiences	Gap
Grade student responses to discussion questions	3.79	3.54	0.25
Use asynchronous lectures	4.35	3.93	0.42
Have regular office hours for consultation	4.01	3.59	0.42
Participate in class-level discussions	4.18	3.67	0.51
Provide prompt feedback	4.65	4.05	0.6
Use synchronous lectures that allow "real-time" questioning and responding	3.36	2.65	0.71
Have social communication with students	3.76	3.03	0.73
Participate in group-level team discussions	3.87	3.11	0.76
Check student progress regularly	4.19	3.17	1.02
Average gap			0.60

As shown in the Table 4.24, the rank order of the experiences and preferences are fairly consistent with each other except the “check on student progress regularly.” Instructor checking on student progress regularly was not perceived as a frequently occurring activity,

but it was preferred higher (ranked 3rd) on the list. This indicates that students want to be checked on their academic progress regularly by instructors.

Table 4.24: Relative ranking differences of experiences and preferences for learner-instructor interactive activities

Instructional activities for learner-instructor interaction	Ranking Experiences	Ranking Preferences
Prompt feedback	1	1
Asynchronous lectures	2	2
Instructor participate in class-level discussions	3	3
Regular office hours for consultation	4	5
Grade on student responses to discussion questions	5	7
Check on student progress regularly	6	3
Instructor participate in group-level team discussions	7	6
Social communication with students	8	6
Synchronous lectures	9	9

Within learner-learner interactive activities, experiences of team-based projects and assignments exceeded learner preferences of this activity, indicating that online learners may want to have less team-based activities. Online learner experiences related to chatting with peers informally, giving/getting feedback among peers, and role-based instructional activities do not seem to meet student expectations. The gaps between preferences for and experiences of these activities are larger than the average gap of all activities in this section. Although role-based activities were rated as the three least-preferred activities on the list of learner-learner interactive activities, the comparison table below indicated that role-based activities had not been used much in practice and should be increased.

Table 4.25: Gap between preferences for and experiences of Learner-Learner activities

Instructional activities for learner-learner interaction	Preferences	Experiences	Gap
Have team-based collaborative projects and assignments	4.26	4.39	-0.13

Have class-level large-group asynchronous discussions	3.54	3.42	0.12
Have small-group asynchronous discussions among students	4.1	3.8	0.3
Have synchronous chat sessions for students to engage in "real-time" discussions	3.63	3.14	0.49
Share course-related information and resources with my peers	4.3	3.69	0.61
Have informal chats with peers where we share experiences and beliefs etc	4.14	3.37	0.77
Give feedback to my peers	3.95	3.08	0.87
Utilize task roles	3.3	2.43	0.87
Get feedback from my peers	3.97	3.03	0.94
Have student online debating team activities	3.4	2.39	1.01
Have online role-playing activities (e.g., playing different roles in a case).	3.47	2.18	1.29
Average gap			0.64

Among all the learner-learner interactive activities, “having class-level large group asynchronous discussions” had the largest ranking difference between its experiences and preferences order on the list. The reasons for this relatively huge rank order difference was addressed in the follow up interviews. Although it was used often in practice, student did not prefer to engage in class-level large group discussions mainly because of the large class size, duplicated ideas, and unclear rules and expectations.

Table 4.26: Relative ranking differences of experiences and preferences for learner-learner interactive activities

Instructional activities for learner-learner interaction	Ranking Experiences	Ranking Preferences
Have team-based collaborative projects and assignments	1	2
Have small-group asynchronous discussions among students	2	4
Share course-related information and resources with my peers	3	1
Have class-level large-group asynchronous discussions	4	8
Have informal chats with peers where we share experiences and beliefs etc	5	3
Have synchronous chat sessions for students to engage in "real-time" discussions	6	7

Give feedback to my peers	7	6
Get feedback from my peers	8	5
Utilize task roles	9	11
Have student online debating team activities	10	10
Have online role-playing activities (e.g., playing different roles in a case).	11	9

Within learner-self interactive activities, online learner experiences of summarizing key points of the content, reflecting on what they have learned, keeping a study journal, and being encouraged to use what is learned in real life did not meet their preference level for these activities. Online practitioners may consider adding more of these activities to their courses.

Table 4.27: Gap between preferences for and experiences of Learner-Self activities

Instructional activities for learner-instructor interaction	Preferences	Experiences	Gap
Read over each other's discussions (both on-going and archived discussions) in the online forums	4.03	3.72	0.31
Are given individual problem-solving opportunities, such as responding to questions independently	4.13	3.5	0.63
Write critiques or reflection papers about key course topics or concepts	3.43	2.8	0.63
Prepare questions before the next class or academic topic	3.6	2.93	0.67
Summarize take away key points of major topics or discussions.	4.14	3.34	0.8
Reflect on what we have learned	4.15	3.34	0.81
Keep an electronic study journal	2.51	1.62	0.89
Are encouraged to utilize what we have learned in real life situations	4.63	3.71	0.92
Average gap			0.71

The relative ranking differences of experiences and preferences in Table 4.28 illustrate that “reading over each other’s discussions in the online forums” was the most frequently used learner-self interaction activity; but it was not the most preferred item on the

list (ranked fifth). The reasons for low preferences toward this activity were similar to the reasons for low preferences toward the class level large group discussions. These low preferences were mainly due to the large class size, duplicated ideas, and lack of instructor participations in discussions.

Table 4.28: Relative ranking differences of experiences and preferences for learner-self interactive activities

Instructional activities for learner-instructor interaction	Ranking Experiences	Ranking Preferences
Read over each other's discussions (both on-going and archived discussions) in the online forums	1	5
Apply what have learned in real life situations	2	1
Be given individual problem-solving opportunities such as responding to questions independently	3	4
Reflect regularly on what have learned	4	2
Summarize take away key points of major topics or discussions.	5	3
Prepare questions before next class or academic topic	6	6
Write critiques or reflection papers about key course topics or concepts	7	7
Keep an electronic study journal	8	8

The average gaps of interactive activities in each section demonstrated that the biggest preference-experience gap is in learner-self interaction activities (0.71). The gap within learner-instructor activities is the smallest (0.60), thus indicating online learner preferences for learner-instructor interactive activities were better met in practice than their preferences for learner-learner and learner-self interactive activities.

Research Question 3: relationships between learner demographic attributes and preferences for online interactions

The third research question of the study is "Is there a relationship between learners' gender, age, online experience, marital status, job status or personality and their preferences for online course interactions?" Specifically, it contains seven sub-questions:

1). Do learner preferences differ between male and female learners?

2). Is there a relationship between learner preferences and learner age?

3). Is there a relationship between learner preferences and learner prior online experience?

4). Do learner preferences differ among learners who are married and raising children, married with no children, single parents, and single?

5). Do learner preferences differ among learners who work full-time, part-time, or are unemployed?

6). Is there a relationship between learner preferences and individual personality traits?

7). How much variance of the learner preferences can be explained by gender, age, online experience, marital status, work status, and personality traits?

RQ3.1: Do learner preferences differ between male and female learners?

To answer this question, a one-way ANOVA test was used to compare the means between female and male learners for three types of interactions. As explained in the previous section, each subject had a calculated score for preference of each type of interactions that was derived based on the factor analysis.

ANOVA results showed that there was no significant difference on the preferences for all three types of interactions between female and male learners. A further analysis at the two dimensions of learner-learner interaction, engaging in discussions and collaborations,

and sharing information and taking roles in class activity, also did not determine any significant differences of preferences for these interactions between female and male students.

Table 4.29: Effects of gender on preferences for interactions

	F	Sig.
Learner-instructor	.699	.404
Learner-learner	.195	.773
Learner-self	.079	.778
Engaging in discussions and collaborations	.003	.960
Sharing information	.101	.751
Taking roles in class activity	.992	.321

An item-level ANOVA test with Bonferroni correction did not determine any significant preference differences of any instructional activities between female and male online learners. A Bonferroni correction was used to reduce the chance of making a type I error due to the multiple comparisons. The corrected alpha level was about 0.002 (0.05 divided by the number of items that were tested). Therefore, any significance level that was smaller than 0.002 was considered statistically significant in the item-level analysis of the current study.

RQ3.2: Is there a relationship between learner preferences and learner age?

The Pearson correlation analysis was used to determine whether there were significant relationships between learner preferences for each type of interaction and learner age. The results revealed that age was positively correlated with learner preferences for learner-self interaction ($r=.158$, $p=.030<.05$). This indicates that online learner preferences for learner-self interaction increase with learner age, meaning older online learners tend to prefer learner-self interactions more than younger online learners.

Table 4.30: Effects of age on preferences for interactions

	Learner-instructor	Learner-learner	Learner-self	Sharing information	Taking roles in class	Engaging in discussions &

					activity	collaborations
Age (r)	.110	.043	**.158(*)**	.141	-.072	.015
Sig.	.132	.556	**.030**	.054	.328	.834

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

To determine which interaction activities were significantly correlated with online learner's age in learner-self interaction, an item-level analysis of eight activities with Bonferroni correction was conducted ($\alpha < 0.05/8=0.006$). Age was positively correlated with preparing questions before class ($r=.212$, $p=.004<.01$) and keeping an electronic study journal ($r=.208$, $p=.004<.01$).

RQ3.3: Is there a relationship between learner preferences and learner prior online experience?

To examine whether there was a relationship between learner prior online learning experience and each type of interaction, a Pearson correlation analysis was conducted between the number of previously taken online courses and the ratings of preferences for each type of interaction. The result indicated that there was no significant correlation between the number of previously taken online courses with learner preferences for learner-instructor, learner-learner, and learner-self interactions (see table below).

Table 4.31: Effects of prior online experience on preferences for interactions

	Learner-instructor	Learner-Self	Learner-learner	Sharing information	Taking roles in class activity	Engaging in discussions & collaborations
Number of prior taken online courses (r)	.038	.048	.103	.009	.115	.119
Sig.	.604	.516	.159	.898	.115	.104

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

An item-level correlation analysis with Bonferroni correction ($\alpha < 0.05/28 = 0.002$) was used to determine whether any instructional activities are related to learner prior online

experience. Results showed that the number of online courses taken was negatively correlated with preferences for having synchronous lectures (r= -.234, p=.001).

RQ3.4: Do learner preferences differ among learners who are married and raising children, married and have no children, single parent, and single?

A one-way ANOVA test was used to examine whether online learner preferences for interactive instructional activities were related to marital status. SPSS initially reported that this test could not be performed since Group 3 (single parent group) only had one case. Therefore, the single parent case was removed from the data set prior to the final ANOVA test. Results revealed that learner marital status had an effect on learner preferences for learner-learner interaction (F=6.319, p=.002<.01).

Table 4.32: Effects of marital status on preferences for interactions

	F	Sig.
Learner-instructor	1.825	.164
Learner-self	.521	.595
Learner-learner	**6.319**	**.002**
Sharing information	1.842	.161
Taking roles in class activities	**4.096**	**.018**
Engaging in discussions and collaborations	**6.994**	**.001**

To determine how marital status influenced online learner preferences for the learner-learner interaction, a Sheffe post hoc test was conducted. As shown in Table 4.31 below, online learners who were married and raising children preferred to have learner-learner interaction significantly less than those who were married with no children (MD=-.266, p<.05). Within learner-learner interaction, those who were married and raising children preferred to take roles in class activities and to engage in discussions and collaborations less than those who were married with no children (MD=-.383, p=.018<.05; MD=-.352, p=.002<.01).

Table 4.33: Scheffe test of the effects of marital status on preferences for interactions

Dependent Variable	(I) marriage	(J) marriage	(I-J) Mean Difference	Sig.
Learner-learner interaction	married & raising children	married & no children	**-.26631(*)**	**.003**
		single	-.03618	.924
	married & no children	married & raising children	**.26631(*)**	**.003**
		single	.23013	.059
	single	married & raising children	.03618	.924
		married & no children	-.23013	.059
Taking roles in class activities	married & raising children	married & no children	**-.38281(*)**	**.018**
		single	-.17367	.544
	married & no children	married & raising children	**.38281(*)**	**.018**
		single	.20915	.453
	single	married & raising children	.17367	.544
		married & no children	-.20915	.453
Engaging in discussions and collaborations	married & raising children	married & no children	**-.35159(*)**	**.002**
		single	-.0585	.875
	married & no children	married & raising children	**.35159(*)**	**.002**
		single	.29309	.052
	single	married & raising children	.05850	.875
		married & no children	-.29309	.052

* The mean difference is significant at the .05 level.

RQ3.5: Do learner preferences differ among learners who work full-time, part-time, or are unemployed?

In terms of work status, the sample had uneven group sizes. Among survey respondents, 179 had full-time jobs, 2 part-time, and 7 unemployed. Since running an ANOVA with a small sample size may lead to problems of homogeneity of variance (Howell, 2002), I combined the part-time and unemployed subjects into one group to compare it with the larger group of the full-time employed respondents on the dependent variables. Result showed that online learner preferences for interactions were not significantly related to their work status.

Table 4.34: Test of the effects of marital status on preferences for interactions

	F	Sig.
Learner-instructor interaction	.026	.872
Learner-self interaction	.702	.403
Learner-learner interaction	.710	.400

Sharing information	1.961	.163
Taking roles in class activities	.051	.822
Engaging in discussions and collaborations	.343	.559

A closer examination of the data at item-level also did not show any statistically significant result and further confirmed that work status had no effect on learner preferences for online interactions.

RQ3.6: Is there a relationship between learner preferences and individual personality traits?

A Pearson correlation analysis was conducted to examine any potential relationship between each dimension of personality trait and learner preferences for learner-instructor, learner-learner, or learner-self interactions. The results indicated that only openness to experiences was positively correlated with preferences for learner-self interaction ($r=.170$, $p=.020<.05$). Personality traits of extraversion, agreeableness, conscientiousness, and emotional stability did not have impact on learner preferences for any type of interactions.

Table 4.35: Effects of personality traits on preferences for interactions

	Learner-instructor	Learner-self	Learner-learner	Sharing Information	Taking roles in class activities	Engaging in discussions & collaborations
Extraversion	.139	-.047	.094	.055	.023	.123
Agreeableness	.042	.112	.023	.088	-.077	.056
Conscientious	.096	.027	-.005	.046	-.068	.003
Emotional stability	.033	.056	-.002	-.018	.015	.006
Openness to Experience	.131	**.170(*)**	.064	.029	.027	.095

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

RQ3.7: How much variance of the learner preferences can be explained by gender, age, online experience, and personality traits?

Due to the lack of previous research and proven effective models in the relevant literature, the current study used the Stepwise regression procedure—which is solely based on statistical criteria—to determine any significant regression model. To prevent possible

multicollinearity in this analysis, a matrix of correlation among all the independent variables were first calculated using a Pearson correction coefficients analysis. The results show that all of the variables have a correlation of less than 0.5, which is a cut-off point for multicollinearity, thus precluding the possibility of having multicollinearity issue of this regression analysis. The assumptions of normality, linearity, and homoscedasticity were further examined and no violations of multiple regression assumptions were exposed. It is important to note that the categorical variables are dummy coded. Two new variables, "married" and "having kids," were generated to represent the original variable of marital status that had categories of married and raising children, married with no children, single parent, and single.

Preferences for learner-instructor interaction: A multiple regression analysis was used to determine how much variance in learner preferences for learner-instructor interaction could be explained by the personality traits and other six independent variables. Gender, married or not, having kids or not were three categorical variables among these predictors.

The stepwise regression analyses generated a statistically significant model (R^2=.045, $F_{3,183}$=2.88, P=.04<.05) that explained 4.5% of the variance in learner preferences for learner-instructor interaction. The predictor variables in the model were learner age, extraversion, and openness to experience. Although the model was statistically significant at the 0.05 level, a further analysis of coefficients of three predictor variables (age, extraversion, and openness to experience) illustrated that independently counting these predictor variables did not significantly alter the model.

Table 4.36: Regression analysis of preferences for learner-instructor interaction

R^2=.045	R^2 Adjusted=.029	$F_{3,183}$=2.88	P=.04

	Standardized Beta	Std. Error	Sig.
(Constant)	2.991	.338	.000
Age	.118	.006	.104
Extraversion	.124	.030	.093
Openness to Experience	.112	.044	.128

Preferences for learner-self interaction: The Stepwise regression model generated a statistically significant model (R^2=.053, $F_{3,183}$=5.10, P=.007) that explained 5.3% of the variance of learner preferences for learner-self interaction. The variables contributing to this model included age and openness to experience. A further examination of coefficients of these two predictor variables revealed that they both significantly contribute to the model. The positive signs indicate that the older the learner and the more open they are to experience, the more they tend to prefer learner-self interaction.

Table 4.37: Regression analysis of preferences for learner-self interaction

R^2=.053	R^2 Adjusted=.042	$F_{3,183}$=5.10	P=.007

	Standardized Beta	Std. Error	Sig.
(Constant)	2.935	.262	.000
Age	.153	.005	**.034**
Openness to Experience	.165	.036	**.022**

Preferences for learner-learner interaction: The Stepwise regression model generated a statistically significant model (R^2=.077, $F_{3,183}$=3.79, P=.005) that explained 7.7% of the variance of learner preferences for learner-learner interaction. Variables contributing to this model included having kids, prior online course experience, age, and married. A closer look of coefficients of these independent variables revealed that having kids negatively contributed to the model of preferences for learner-learner interaction (p=.001<.01), indicating that people with more family responsibilities prefer less to have learner-learner interactions.

Table 4.38: Regression analysis of preferences for learner-learner interaction

R^2=.077	R^2 Adjusted=.056	$F_{3,183}$=3.79	P=.0205

	Standardized Beta	Std. Error	Sig.
(Constant)	3.465	.191	.000
Age	.131	.005	.088
Prior taken online courses	.117	.005	.101
Married	.154	.095	.055
Have kids	-.298	.082	**.001**

Preferences for sharing information: The Stepwise regression model generated a statistically significant model (R^2=.058, $F_{3,183}$=2.84, P=.026) that could explain 5.8% of the variance of learner preferences for sharing information with peers. The variables contributed to this model included learner work status (fulltime, part-time, not employed), age, married, and having kids. Among them, age positively contributed to the model (p=.013<.05), indicating that older learners preferred more to share information with others.

Table 4.39: Regression analysis of preferences for sharing information

R^2=.058	R^2 Adjusted=.038	$F_{3,183}$=2.84	P=.026

	Standardized Beta	Std. Error	Sig.
(Constant)	4.014	.389	.000
Work Status	-.125	.111	.086
Age	.193	.007	**.013**
Married	.123	.119	.131
Have kids	-.188	.103	.029

Preferences for taking roles in class activities: The Stepwise regression model generated a statistically significant model (R^2=.047, $F_{3,183}$=4.58, P=.011) that could explain 4.7% of the variance of learner preferences for taking roles in class activities. The variables contributing to this model included the number of previously taken online courses and having kids. A further examination revealed that having kids negatively contributed to the model (p=.011<.01), indicating that learners with more family responsibilities preferred less to participate in collaborative task roles in their online learning.

Table 4.40: Regression analysis of preferences for taking roles in class activities

R^2=.047	R^2 Adjusted=.037	$F_{3,183}$=4.58	P=.011

	Standardized Beta	Std. Error	Sig.

(Constant)	3.384	.111	.000
Prior taken online courses	.130	.009	.073
Have kids	-.185	.119	**.011**

Preferences for engaging in discussions and collaborations: The Stepwise regression model generated a statistically significant model (R^2=.079, $F_{3,183}$=5.23, P=.002) that could explain 7.9% of the variance of learner preferences for engaging in discussions and collaborations. The variables contributing to this model included the number of previously taken online courses, being married, and having kids. A further examination revealed that marital status positively contributed to the model (p=.035<.05), indicating that married people prefer to engage in discussions and collaborations more than single online learners. On the other hand, having kids negatively contributed to the model (p=.001<.01), indicating that learners with more family responsibilities prefer less to engage in discussions and collaborations.

Table 4.41: Regression analysis of preferences for engaging in discussions and collaborations

R^2=.079	R^2 Adjusted=.064	$F_{3,183}$=5.23	P=.002

	Standardized Beta	Std. Error	Sig.
(Constant)	3.805	.107	.000
Prior taken online courses	.129	.006	.071
Married	.168	.117	**.035**
Have kids	-.280	.119	**.001**

In summary, online learners' gender, number of prior online courses taken, and work status were not associated with learner preferences for all three types of interactions at a statistically significant level. Learner age shows a positive relationship with learner preferences for learner-self interaction, indicating that older online learners prefer to self-reflect on what have learned more than younger learners. Marital status is significantly related to learner preferences for learner-learner interactions. Specifically, online learners who are married and raising kids prefer to take roles in class activities less and also prefer to engage in discussions and collaborations less than those who are married with no children,

although both groups have the same level of preferences toward sharing information with others. Personality traits failed to show any significant association with learner preferences for learner-instructor and learner-learner interactions. Openness to experiences is the only type of personality trait that is positively correlated with learner-self interaction, indicating that people who are more open to experiences tend to have more self-reflection on what is learned than those who are not open to experiences. Stepwise regression analysis showed that gender, age, prior taken online courses, marital status, job status, and personality traits only explained a small portion of variance in learner preferences for interactions (4.5% ~ 7.9%).

Chapter Summary

This chapter answers the first three research questions of the study including what instructional activities are used to promote online course interactions, which of them are preferred by students, and how individual and environmental factors may influence student preferences of these interaction activities. A number of findings were summarized from student survey result below:

- Interactions in online learning environment take place largely through team-based collaborative tasks, prompt feedback from instructors, asynchronous lectures, asynchronous discussions, sharing resources with peers, and regular office-hour consultations.
- Anything requiring synchronous involvement or taking role in class activities is not used much in current online practice.
- Learner self-reflection on the subject matter happens mostly through reading discussions, using what has been learned in real life situations, and in responding

to questions independently. Unlike many face-to-face students, online learners do not usually "come to class" with questions prepared.

- Online learners prefer receiving prompt feedback, participating in asynchronous lectures and discussions, sharing resources and experiences with peers, and participating in team-based task collaborations.
- Online learners expressed desire to know peers through informal chat, but in reality informal chats among learners only happen sometimes.
- Learner preferences toward class-level asynchronous discussion had ranked much lower even though it was used quite a lot in online learning.
- Online learner preferences for reading each other's discussions ranked much lower, although it was the most frequently used instructional activity that promotes learner-self interaction.
- In general, online learners prefer to engage in all three types of interactions. However, their preferences for these interactions decline in the order of interacting with instructors, peers, and self.
- Within learner-learner interaction, online students most prefer to share information with peers, and next prefer to engage in discussions and collaborations.
- They least prefer to take roles in class activities such as moderating a discussion, playing an individual role in a case, taking responsibility in a debating team, etc.
- Online learners' gender, number of prior taken online courses, and work status are not associated with learner preferences for all three types of interactions at a statistically significant level.

- Learner age shows a positive relationship with learner preferences for learner-self interaction, indicating that older online learners prefer to self-reflect on what have learned more than younger learners.
- Marital status is significantly related to learner preferences for learner-learner interactions. Specifically, online learners who are married and raising children prefer to take roles in class activities less and also prefer to engage in discussions and collaborations less than those who are married with no children, although they have same level of preferences toward sharing information with others.
- Personality traits failed to show any significant association with learner preferences for learner-instructor and learner-learner interactions.
- Gender, age, prior online courses, marital status, job status, and personality traits explained only a small portion of variance in learner preferences for interactions (4.5% ~ 7.9%).

Chapter Five: Discussion

Besides discussing the major findings and implications of the survey results, this chapter also answers the fourth research question of the study: "Why do learners prefer some instructional activities over others?" The specific interview questions were generated from survey results and listed in the appendix section (Appendix A). The purpose of this part of the study was to deepen understanding on the possible reasons why learners prefer certain activities over others and how we might change the design of instruction to better facilitate online learning in the future. Using the constant comparative method of grouping answers by questions, I tried to relate the emerging themes from student telephone interviews back to the survey results to provide comprehensive explanations and/or the implications of the research findings.

Summary and discussions of findings

Experiences of and preferences for learner-instructor interactions

Importance of balancing synchronous and asynchronous communications: The survey results showed that learner-instructor interactions occurred mainly through asynchronous communications. Asynchronous communications include asynchronous lectures, feedback, and discussions. Asynchronous communication enables students to engage in learning whenever and wherever. It was not surprising to find that online learning is dominated by asynchronous communications given the fact that online learning is often chosen for its flexibility and convenience. However, it is also deemed important to add synchronous components to an online course. The open-ended question results of the survey revealed that online students wanted to have a certain degree of synchronous communications. Based on

their learning experiences, several students commented that synchronous sessions should be used in certain aspects of online education:

> "I have found that when a teacher offers at least one classroom-like lecture in an online course, the class is typically more effective and enjoyable. Examples would include a class-wide chat session walking through problems or topics of discussion with Q & A." (#33)*

> "Chat is good but not as a means of delivering a lecture. Chat should be used for Q & A, not lecturing." (#89)

It seems both types of communication are important for a successful online course. This confirms what Wang and Newlin (2001) stated:

> "We believe that the type of interaction fostered by online chat rooms will enhance and clarify the information that is gathered via asynchronous interactions. Both types of information delivery systems are needed. Whereas we think of asynchronous communications as the 'backbone and muscle' for course content, online chats are the 'heart and hustle' of our Web-based courses." (2nd page online)

Synchronous communication provides the immediacy essential for successful interaction and also makes online students and instructors more visible to each other. It helps develop a sense of community and decrease a feeling of isolation, which is considered the most challenging obstacle in online education (Palloff & Pratt, 1999). However, it is important to note that synchronous communication will not work for just any type of activity. This point is illustrated not only by the student comments above, but also by the survey and interview results. Student ratings related to their preferences for learner-instructor activities indicated that synchronous lectures were the least-preferred item on the list of instructional activities promoting learner-instructor interactions. Therefore, it is critical to determine which part of an online course should be synchronous and how much synchronous communication is appropriate. One of the student interview questions addressed this issue

* Quotations designated by numbers come from open-ended responses to the survey questionnaire.

particularly. In general students did not expect to have any synchronous lectures, but expressed appreciation toward synchronous Q and A sessions with instructors.

> "I don't see as much of a benefit having synchronous lectures aside from being able to ask questions in question and answer session" (Richard)*

> "It was really nice to have the chat session with the professors…even though I was not online at the same time, I still felt that interaction with the instructors because I was able to go back and look at what they said, or wrote [in the archives]." (Matthew)

However, students pointed out that synchronous Q and A sessions with instructors should be at the small group level; otherwise, it gets difficult to follow along in a chat session.

> "…synchronous communication with the professors, I think needs to be more on a smaller level. Not on a class lecture level. Small teams, for example, meeting with the professor to talk about something specific." (William)

> "Some professors set up chat sessions and I have been there, but again, the group is too huge. Like one professor to 40 students. I don't know, I don't get the most out of it." (Sandra)

> "I think synchronous chat is a good idea, but…I think the smaller groups of people, like ten or so…Otherwise, it becomes too unruly." (Adam)

Therefore, overall findings suggest that balancing synchronous and asynchronous communications is important to meet student needs for course flexibility and also for fostering an interactive learning community. Having an instructor-led synchronous Q and A session with a manageable number of students was a recommended interactive strategy that emerged from this study.

Social versus content related interactions with instructors: Student interview data revealed that they appreciated having social interaction with professors, but also

* Quotations designated by names come from interviews.

felt it was not something that they had to have, especially given the tight schedule of everyone and the nature of online communication.

> "[social interaction with professors] would be nice, but it hasn't been a problem that I haven't had it…I haven't really felt the need for any kind of interaction with them outside of the class." (Matthew)

> "For social interaction, I would say right now I am at a point where I can't afford too much time for that" (Sandra)

> "Mostly course related. I don't feel a need for a social interaction [with professors]. I think it is kind of difficult to do when you are doing it online as well" (Richard)

While students did not expect to have much social interaction with instructors, they desired frequent communication on course-related issues.

> "…on average I say that at least once a week and preferably twice a week to have interaction from the professor, not one to one, but some interaction with the course" (William)

> "…at the beginning of the course, a little bit of social interaction just to get to know each other…that is all the social interaction that I need…the rest of it would be course interaction." (Adam)

As part of content-related learner-instructor interactive activities, "checking student progress regularly" was rated as the activity that most needed to be increased in amount. The gap score between learner preference for and experience of "checking student progress regularly" turned out to be the largest among all nine learner-instructor interactive activities. This indicates that online learners hope to have instructors to check on their academic progress more frequently than is currently being done.

The remaining question is: How much interaction is appropriate for an online class? Interview data suggested that the amount of learner-instructor interaction

should be need-based. The nature of the course, the way the instructor is conducting the class, and entry level of individual knowledge on the topic all seem to contribute to the actual interaction generated between students and instructors.

> "It depends; all courses are not the same. Some of them are more hands on because they have the material already there. Some of them are more interactive." (Sandra)

> "I haven't really spent a lot of time interacting directly with professors online. It is usually by posts and forum…I think it varies by the course and it varies by the instructors too." (Dillon)

> "It really depends on the courses. In the first quarter, I took Economics and I would say that I sent out maybe hundreds of e-mails to the professor." (Yang)

In summary, the overall findings suggest that online learners expect instructors to design learner-instructor interactions with increased follow up messages to check student progress regularly. Instructors should be available and responsive when there is specific need from individuals. Although current finding on social versus content related interactions between learner and instructor suggested that online learners in general did not expect to have much social interaction with instructors, this does not mean the social role of the instructor is unimportant. Berge (1995) proposed four roles that online instructors usually play in their teaching: pedagogical, social, managerial, and technological. He further pointed out that the social role of online instructors is an imperative moderating skill. Sending welcome message at the beginning, encouraging participation, and using friendly and personal tones are all considered to be important in establishing a comfortable learning environment for learners. Therefore, it is important for online instructors to understand that social roles are not necessary to be played out for socialization; instead, it should be embedded into daily interaction with students on course related

issues. In effect, the purpose of the social role is to create a friendly learning environment conducive to online learners.

Experiences of and preferences for learner-learner interactions

The survey results showed that team-based collaboration was the most frequently used instructional method that promotes learner-learner interactions and the second preferred learner-learner interaction item on the list, following the preference for sharing course-related information and resources with peers. Collaborative learning often creates a learning environment in which learners can exchange information, build trust, share ideas, and solve problems together. It seems natural to expect the increase in use of team-based learning since today's world requires people to engage in collaboration frequently.

Two concerns regarding collaboration were raised from student open-ended question responses and interview data:

1.) The necessity of having teammates with diverse backgrounds: Online students feel that they can learn from each other more if group members have different backgrounds. Two students commented below:

> "I found the group work to be very beneficial to learning from the different points of view based on the varying backgrounds of the group." (#93)
>
> "This is more real world – you don't typically get to choose your teammate, plus it provides a greater view of other people's ideas." (#48)

Students who work in a team have greater opportunities to know each other. Arranging for students to work in different teams can help them to become familiar with more of their classmates. This, in turn, helps build a greater sense of community. However, student interview data revealed that a majority of interviewees preferred to have one team

throughout a course, although they acknowledge the value of having different teams in a course.

> "Where the projects are small, changing teams might be good because that way you get a different fresh interaction. But I think in most courses it's beneficial to have the same team because there's a certain amount of time spent in getting to know the team members, setting up the team, setting up a time to interaction." (William)

> "I think that you should be able to work with one group consistently through the course and you have some continuity and you build relationships." (Jessica)

The findings on this topic suggested that online students preferred to keep the same team throughout a course, mostly for the sake of efficiency. In order to promote diversity within a group and to help students to know more classmates, online instructors may assign teams instead of letting students to pick on their own. On the other hand, instructors may mix groups for discussions and other smaller-scale interactive activities while keeping same team members for bigger projects.

2) Needs for having synchronous group meeting: Working in a group often requires intense communication among team members. Online students appear to be trying hard to find a good way to conduct synchronous group meetings.

> "I think group should be encouraged to use 'IM' (Internet Messenging) more often for group work." (#65)

> "The only other thing I would like to have is some other method for synchronous student/group level communication. My teams have found conference calls to be much more beneficial than chat rooms." (#76)

> "I would have liked the school to provide capabilities to do web meetings and conference calls for group work." (#23)

Given the fact that group work is the most frequently used instructional activity that promotes learner-learner interactions, it is important to address student needs for conducting successful team collaborations, especially in an online MBA program. The practical implication of this piece of information is that online practitioners should find a stable synchronous communication channel for students. The institution might consider building its own phone bridge network to allow students to schedule and create conference calls.

"Satisfying" performance instead of optimizing learning outcomes: First of all, online students perceive role-based activities as an effective learning strategy.

> "It does make you engage more and you are required to do it so you have to do it and then, especially in the law setting, you know that whatever you post is going to get critiqued and examined so you want to make sure you are well prepared." (Paulo)

> "Being someone that's responsible for a forum discussion for the course…that's a good responsibility and I think that's good learning experience." (William)

> "[In business law class] I am the plaintiff, in my heart I don't believe I should be the plaintiff, but I have to be. I have to go beyond what I think is fair and learn the real thing about law. That is definitely helpful." (Sandra)

Second, students feel that it takes extra effort and time to engage in roll-based activities.

> "Yeah, I think it takes extra effort. Actually when you don't like what you've been assigned versus like. I think it takes extra effort and extra creativity." (Aden)

> "You feel that you must really know your role very well because your classmate's grade depends on how well you know your role…I think it is extra effort, but I think it is worth it." (Richard)

Third, students expressed that they want to have more role-based activities when the course content is appropriate for such activities.

> "I definitely think there needs to be more of the [role-based activities] because some professors use that a lot, but there's far too many that do not." (William)

> "Although [role-based activities] take more time and responsibilities, I still like to have them in my learning." (Adam)

> "It does take more time to prepare, but in the right kind of a course though, I think it is an appropriate thing…But in other courses, it wouldn't make a whole lot of sense to have [role-based activities]." (Paulo)

> "I think it is more need based again. I think it works really well for business law, but a lot of my other classes like the economic ones and that kind of thing I don't see where the roles of being that much of a difference." (Dillon)

In the above comments, we see a pattern wherein students believe engaging in pre-designated roles is a productive learning process because they feel a responsibility to play their roles well. At the same time, engaging in role-based activities takes extra time and energy, thus many students do not express a high preference for role-based activities compared with other, less time-consuming interactive activities. Once again, we see a dilemma that students want to have productive learning experiences, but at the same time they do not want to spend too much time on the learning tasks.

This finding confirms what several other researchers have already pointed out as "satisfying performance" in the literature. Weinberger (2003) and Liu (2006) found that online students tended to satisfy a minimum (or good enough) requirement regarding both social and cognitive demands of the learning tasks. This satisfying performance, instead of optimizing learning outcomes, further suggests that student preferences for learning activities may not be directly associated with student

perceptions of effective learning, especially if the activities take more time and energy.

So, the remaining question is: How much role-based activity is appropriate, considering both student preference levels and the necessity of it for effective learning? There is no straightforward answer to this question. Although we agree that the nature of the course content influences whether more role-based activities are suitable, the large gap between student preference for and the experience of having role-based activities still indicated that such activities should be implemented more frequently in current online practice in general.

Discrepancies exist between learner experiences of and preferences for learner-learner interactions. The survey data showed that online students prefer informal chats with peers over engaging in class discussions and getting/giving feedback to each other; however, their experience survey revealed that informal chats among learners only happened sometimes. This indicates that online learners in this particular study hope to know each other more through informal chats. But, in actuality, such a desire to know peers does not have a high priority compared with those course-related discussions that students are required to engage in. As a result, informal chat with peers remains as a desirable, but not a have-to-do, activity. This point was further illustrated by student interview data.

> "…everybody's really busy and if I spend time socializing with them, it means that I have that much less with my family…for the most part, I'm not looking for friendships and social opportunities with my peers, except for professional networking and career development." (Aden)

> "Obviously the course is actually what you are there to do; personal interaction without course work is meaningless. It's nice but it doesn't really help…but there are still people that I keep in touch with…I think that is

> something that I want to do a lot more of, try to keep those relationships going." (William)

Another finding is that learner preference for class-level asynchronous discussion ranked quite low on the list of learner-learner interaction items, even though it was used quite often in online learning. This shows that online learners may have had unpleasant experiences with class-level discussions in the past. Since class-level discussion is one of the frequently used instructional methods in online education, it is critical to understand why students do not prefer to have class-level discussion as much. How can it be improved? These issues were addressed in the student interviews. Results indicated that the relatively low preferences for class-level discussion were related to large class size, repetitive postings, and the way in which professors set rules and expectations.

> "I don't like the entire class discussions because so many people go in there and they end up posting the same thing that's already been said 18 times" (Aden)

> "I like [whole class discussions] if the class is small…[otherwise] impossible to do it that way. I am very frustrated with that…Because there are too many people. You cannot have an actual conversation with 100 people." (Jessica)

> "The successful forum discussions that I've been involved in, really enjoyed and learned from, the professor set ground rules…And one of the things that has helped is to understand that the forum is not a place to say, yeah that was great…you wouldn't want to read a lot of material that was meaningless and probably repetitive of what others have said." (William)

Obviously, class-level discussions can become overwhelming if there are too many students in a class. It takes extensive time to read through all the discussions in that case. It can be boring and time-wasting if there are multiple postings that reflect similar ideas. While asked to provide suggestions for improvement, students recommended a number of strategies.

- Dividing up the class into a few groups:

  "One thing that I like … is combining the individual teams of 3, 4, 5 people into groups of teams so there are four or five teams in a group and we just post to that group. So instead of having to read 100 people's posts I just get to see a nice cross section of two or three other teams so it limits it to about 20-30." (Matthew)

  "It is not necessarily the entire class posting. So a class of 70 students maybe there's a forum for 35 and there is another forum for 35 and that's a reasonable number." (William)

- Professor participation in discussions:

  "I like it as long as professors are involved in discussion. I don't particularly like it when they just start a topic and let the class kind of go at it." (Richard)

  "We would like to hear the authority of what it should be or what it could be and that kind of thing. So it is like a little direction on the forum. And that I would prefer." (Sandra)

- Setting clearer rules and expectations:

  "There needs to be rules set up ahead of time in terms of what the expectations are of the discussion. If the topics are too general, that is when the discussions become somewhat useless." (Richard)

  "Sometimes it is kind of vague and you don't always know what you are supposed to say. So it is good to have kind of a specific target of what you are supposed to be talking about." (Paulo)

From the student follow up interviews, we could tell that the relatively low preference for class-level discussions in this study was not because students thought it was unnecessary, but because such discussions were not conducted in an effective way. Students admitted the importance of having class discussions.

"I actually love the forum. I think that is where I learn the most." (Sandra)

> "The process of discussion, debate, interaction and all that are as important as the actual outcome because I learn a lot from other peoples view points. What they're saying, that's very useful." (William)

Given the critical role of class-level discussions in online learning, instructors should always consider how to make it more effective and enjoyable to learners. As Raleigh (2000) pointed out, "planning and implementing the online discussion is key to avoiding the common problems experienced with online discussions." I hope the student suggestions for forum improvement in this study provide useful insights for effective planning and implementation strategies for online instructors to utilize in promoting learner-learner interactions.

Experiences of and preferences for learner-self interactions

Online learners do not usually "come to class" with questions prepared. Survey results showed that learner-self interaction happened mostly through reading discussions, when using what had been learned in real life situations and responding to questions independently. Results further indicated that online learners did not usually come to class with questions prepared. This could be due to the fact that most online lectures were asynchronous in nature and did not have an exact starting time for each lesson. In the traditional face-to-face classroom, students who come to class unprepared risk not being able to understand and answer questions when asked by the teacher. Online students do not have such pressure. They can look at lessons and read others' comments/discussions first before thinking independently. Such learning behavior can result in students not finishing reading materials before class and may lead students to passively accept whatever is delivered to them. This will inevitably lower the effectiveness of learning outcomes.

It is essential to understand online students' learning behaviors and to determine effective methods to promote active learning. Student interviews addressed learning behaviors of online students, such as whether they finish their reading materials before looking at lecture notes, and at one point they usually develop their content-related questions. Results indicated that more than half of the interviewed students try to finish the reading materials before doing anything else and it is perceived as an effective learning strategy.

> "I try to do all the reading first before looking at anything else. That is what works best for me. I feel like I am missing something if I try to just read postings or something, then I don't get as much out of it." (Matthew)

> "before I do anything I will read the book first…I think that would be more effective because usually the lecture notes are a summary…I think you understand the class and you learn more if you put the time into it." (Dillon)

> "I think it's definitely more effective to do the readings first before you can engage in any type of work or conversations or postings or anything else, because you have a general context of understanding the issues at hand besides your own experience." (Aden)

On the other hand, some students think it is more effective if you mix and match reading and posting at the same time, or read the materials with questions in mind.

> "I try to do a mix and match, and as I'm reading, I keep referring to the problems also sometimes, so that I will know that kind of solution I should come up with. And even in the discussion forum, as I keep on reading, I keep posting. So, I would say it goes hand in hand…I would say so far it as been effective." (Adam)

> "Generally I try to get an overview of what I'm going to need to do before I even start the reading…I did pretty well in the past as far as reading material and kind of self teaching." (Amid)

> "Yes, not always, but most, 75% or more of the time [I finish required readings first]…I would say that I usually get more out of the readings that I do the notes." (Richard)

It seems the general learning behaviors of online students in this study are not only influenced by their time schedule and work/family responsibilities, but also related to their learning styles or their perception of what is an effective learning strategy. It is important to note that the notion of effective learning may have different interpretations among individual students. It would be interesting in future research to see whether different learning behaviors result in different learning outcomes.

Students prefer certain activities over others in learner-self interactive activities. Survey results suggested that online learner preferences for reading others' discussions ranked low, although it was the most frequently used instructional activity among a list of activities that promote learner-self interaction. This result could be related to the earlier finding of low student preferences for class-level discussions. If there are too many discussion entries, multiple postings of the same ideas, and an overwhelming amount of postings, it becomes boring and time consuming to read through discussion forums.

Utilizing what was learned in real life situations, reflecting on what was learned, summarizing key points of topics, and solving problems independently were more preferred by online students compared with reading others' postings. The interview data provided further explanations on why students tended to prefer certain activities over others in learner-self interactions. Engaging in these self-interactive activities helps students internalize the knowledge, makes the learning outcomes more visible, and also helps students solve work-related issues.

> "I mean, I always look at the way what we are learning applies to my current job and constantly reflect on it or take notes or you know, figure out ways to make it my own…I would say the majority of what I get out of my MBA and my classes is that internalization" (Richard)

> "Yeah, I like to try to apply such and such an idea perhaps to work and I like it when my employer knows that I'm applying those principles since he's paying for my MBA." (Aden)

> "Yeah, it's come in pretty handy…I tried to apply what we were learning to my actual job and actually came up with some pretty good ideas from that." (Amid)

Student interview data further indicated that students thought both team and individual work were critical for their learning. Most students suggested having 40-50% of individual work and 50-60% of teamwork, on average, in their online classes, although they indicated that the actual percentage of team or individual work in each class should depend on the nature of the course content.

> "It's beneficial to learn from others, but maybe just give some time for us to explore ourselves. Have our own pace to get things done…I like 50/50 arrangement [of individual and team work]." (Yang)

> "I enjoy both. I think if you removed one and kept the other you would miss out on a learning experience. [What percentage of a class work should be individual] should depend on the class, but I think they are both important though in every class" (Richard)

> "Well, there are many times when group experiences, particularly with people who they may not necessarily agree on everything, that's actually the best situation…I learn from people even who I disagree with. When it comes to individual thinking and individual assignments, I also want to be able to formulate my own opinions because I'm a person who's worked on myself a lot… Again it just depends on the course… As an average, I prefer about 60% team work and 40% individual." (William)

A further examination of the student interview data suggested that students liked individual assignments mainly because they could control the work pace and get things done faster.

> "I think it is important to have both, but I enjoy the individual part just being able to do things at my own pace more or less."(Richard)

> "So I think they've both got their pluses and minuses, because the individual ones you can do on your own time and just work at your own speed…"(Amid)

> "I like more [individual work]. They are faster to get done… The teamwork is very extensive, and for when it's individual, we can wind it up fast, so it's just a matter of time." (Adam)

This point can be further illustrated by the comment below. This student thought that he might prefer less individual work if this was not an online program and if he and his cohort were full-time students.

> "It is nicer to have individual deadlines…It would be different if it wasn't the online format and we all didn't have separate jobs and that kind of thing. You know, if it was an in-residence kind of learning experience it would probably be different, but for me I prefer the individual right now." (Dillon)

The relatively large gap between preferences for and experiences of learner-self interactive activities indicated most of these self interactive activities were not implemented enough in online courses. The effectiveness of online courses can improve greatly if instructors encourage students to engage in self-reflective activities. From a constructivist standpoint, learning happens when individuals internalize knowledge. Self-reflective activities can make knowledge internalization more effective and long-lasting.

Preferences differ among three types of interactions

In general, online learners preferred to engage in all three types of interactions. However, the degrees of preference differed significantly. Research results revealed that online learners most preferred to interact with instructors and least preferred to engage in self-interactive activities. Instructors often represent an authoritative figure in terms of the subject matter of the study, and therefore students hope to interact with instructors as much as they can. Within learner-instructor interaction, students most preferred to have class-related interactions with instructors. The preference for having social communication with instructors was ranked second lowest followed by the preference for having synchronous

lectures. This indicated that social communication with instructors was desirable (M=3.76 on 5-point Likert type scale), but not a "must do" action compared with all other content-related instructional activities.

Exploratory factor analysis of learner-learner interaction revealed that learner-learner interaction is not a one-dimensional construct. Instead, it loaded on three dimensions: (1) sharing information, (2) engaging in discussions and collaborations, and (3) taking roles in class activities. Online students most preferred to share information with peers, and next preferred to engage in discussion and collaboration. They least preferred to take roles in class activities, such as moderating a discussion, playing an individual role in a case, taking responsibility in a debating team, etc. In fact, these role-related activities were not often used in practice. Student interview data indicated that the low preferences for role-related activities could because these activities often required more work, such as advanced preparation from students and extra effort to do a good job. Regardless of relatively low preferences for role-based activities, the gap analysis of student preferences for and experiences of using role-based activities suggested that such activities should be implemented more into current online practice.

Effects of learner individual characteristics on preferences for online interactions

Gender, number of prior taken online courses, and work status were not related to learner preferences for all three types of interactions in an online learning environment. The current study showed that female and male online learners did not differ in their preferences for all three types of interactions. In terms of learner prior online experience, the current study found that the number of previously taken online courses had no effect on the three types of interactions. Item-level analyses revealed a significant negative relationship between

the number of prior taken online courses and the preference of having synchronous lectures (r=-.234, p=.001), indicating that the more they experienced online courses, the less they wanted to have synchronous lectures. Student interview data suggested that the main reason of low preference for synchronous lectures could be due to its inflexible nature in terms of time.

> "…might be good to have real-time synchronous lectures like that, but then on the other hand one of the things that attracts people to the online forum is not having to have class times that you know, I don't have to show up at 6:00 for a class. I can study when I want to study." (Paulo)

> "Synchronous lectures will be helpful…but what needs to be recorded and put on the website…because obviously not all of us are going to make it to that lecture." (Adam)

Earlier in this chapter, we discussed the importance of having both synchronous and asynchronous components in online courses. Students generally wanted to have smaller level synchronous Q and A sessions with instructor, but not synchronous lecture, which was rated as the least-preferred item on the learner-instructor interactive activities. Although student interview data provided information on why students did not prefer to have synchronous lectures, we still did not have a direct explanation for why increased online learning experience resulted in decreased preference for online lectures.

One possible explanation could be due to the fact that synchronous lectures were seldom used in current practice, and students were simply conditioned by their prior asynchronous online learning experiences. As a result, the more they experienced taking online courses, the more they felt comfortable with the current way of learning and did not want to make an effort to try new things. Another explanation was that they had unpleasant experiences in their previous synchronous lectures. Anderson et al. (2003) found that synchronous lectures actually increased the feeling of distance of the online students, mostly

due to the technology distraction. In common sense terms, we would say that using synchronous lectures should reduce the feeling of distance. But it seems that the technology development has not reached a point where technology becomes invisible, in other words where robust technologies are everywhere and people do not even notice their existence since they do not cause problems as they do nowadays. Failed technology could severely affect the interactive nature of the course and would further separate students.

The current study also found that learner work status did not have an influence on learner preferences for all three types of interactions. Work status in this study has three categories, including full-time, part-time, and not currently employed. The conclusion of this finding was not definitive, due to unbalanced sample sizes of each group. Most of the online learners who participated in the study were working full-time. There were only two students who were working part-time and seven students were unemployed at the time of survey completion. Although I combined the latter two groups before running the mean difference test, there was still a substantial difference in the group sizes. Therefore, there was a greater risk of bias in the groups that had only a few subjects. Moreover, simply asking them to answer whether they are working full-time is not very informative and can not really represent their workload. Instead, the researcher might have collected information related to how many hours they work each week and how demanding their jobs are. Hopefully this limitation of the current study can be avoided in similar studies in the future.

Age is positively related to learner preferences for learner-self interactions. Survey results revealed a positive relationship between age and learner preferences for learner-self interaction, indicating that older online learners prefer to have self-reflection on what have learned more than those of younger learners. This finding confirms earlier research result

found by Vampola (2001), that older trainees preferred private implementation activities, such as individual learning time, more than younger ones. It seems that the older online student are, the more they enjoy thinking and reflecting individually. The item-level analysis of current study revealed that older learners specifically preferred to prepare questions before class and also preferred to keep a study journal. At the same time, older learners also prefer instructors to provide regular office hours for consultation, and preferred to get and give feedback to peers more than did younger learners. These findings seem to indicate that older online learners are more serious students who are willing to invest more time before, during, and after classes. Older learners appear to be more enthusiastic about learning and appreciate the learning process more than younger online students. Therefore, student maturity seems to be a possible factor that influences online learner-self interaction. In-depth and ongoing self-reflection, the discipline of preparing notes and questions before discussions, and even the practice of thoroughly self-engaging in the course material seem to be related to students' maturity. A practical implication of this finding is for online educators to be more sensitive to the needs of older online learners since they tend to have more questions and concerns. On the other hand, instructors may want to be initiative while working with younger learners.

Family responsibility influences learner preferences for learner-learner interactions. Specifically, online learners who are married and raising children less prefer to take roles in class activities and also less prefer to engage in discussions and collaborations than those who are married with no children, although they have the same level of preference for sharing information with others. Raising children often adds extensive family responsibilities that take time and energy. Therefore, it is not difficult to understand why people who have kids do not prefer those activities that take time and efforts to engage. Since sharing

information does not require so much of time and energy, it is not influenced by the amount of family responsibilities. The above findings indicate that family responsibility is an important factor influencing learner preferences for online interactions.

Online educators should take this piece of information into consideration while designing an online course. If there are many students in a class who have heavy family responsibilities, the instructor may carefully select and assign activities and assignments that require peer interactions. In such a case, individual work with information sharing may be a better choice. This finding could be further explained by Maslow's Hierarchy of Needs theory. It states that each of us is motivated by needs. A person cannot proceed to the next level unless lower-level needs are satisfied. For example, we cannot expect an online learner to be a contributing member of a team while her/his baby is ill. Future studies may consider learner needs for interaction as a variable that can influence learner preferences for online interactions.

Personality traits have little or no effect on all three types of interactions. Personality traits failed to show any statistically significant effects on preferences for learner-instructor and learner-learner interactions. Soles and Moller (2001) predicted that introverts may prefer to reflect on their own more than extroverts. Contrary to this prediction, the degree of extroversion failed to show any significant influence on learner-self interactions. Instead, openness to experiences is the only type of personality trait that is positively correlated with learner-self interaction, indicating that people who are more open to experiences tend to have more self-reflection on what is learned than those are not open to experiences.

Looking at the insignificant findings for the people-to-people interactions prompts the question of whether personality differences get lowered in an online environment. For

instance, introverts may be shy to speak out in a face-to-face classroom situation. Common sense tells us that such personality makes a difference in a student's active participation in a traditional class. However, with so much happening asynchronously in online learning, there is less fear of failure for the students. Introverts may feel free to express their thoughts by actively participating in online discussions. This in turn reduces the effects of personality differences in an online learning environment. This hypothesis is somewhat confirmed by student interview data.

> "When I look back how I was in college and the other master's degree program, I was pretty shy. I did not talk with professors that much. But in this [online] environment, I send numerous emails to the professors and also in class discussion. I speak up a lot." (Yang)

> "For me, it doesn't make any difference whether I'm online or in person because I'm gonna play the same role either way. It's the best of my aggressive personality." (Aden)

> "I am fairly outgoing and I like to talk to people and I like to take leadership…I am probably less personal online than I am in the class room…I think the people that talk more, talk less online and at least from what I have experienced. I think everybody is almost the same lots of times…I think there are less extremes on the Internet than there are in the classrooms it seems." (Dillon)

Therefore, when designing an online course, practitioners should keep in mind that personality trait differences could be diminished in online interactions. However, this does not mean online practitioner should ignore individual differences since a wide range of intelligences, interests, and strengths still exists within a class population. Practitioners should continue to look for a robust set of learning activities that can be incorporated to meet student diversities.

The independent variables only explained a small portion of variance in learner preferences for all three types of interactions. Stepwise regression analysis showed that

gender, age, previously taken online courses, marital status, job status, and personality traits only explained a small portion of variance in learner preferences for interactions (4.5% ~ 7.9%). Although there are a number of statistically significant models determined from the regression analysis, they should be interpreted with caution due to the small amount of variance explained. The smaller R-squares tell us one thing for certain: the personality traits and demographic attributes of interest in this study cannot explain explicitly why there are preference differences among learners in terms of online interactions. This finding brings earlier indications from the literature into question. For instance, Hiltz (1998) indicated that factors influencing online interaction could be more dependent on the student individual characteristics, such as online experience. Chen and Caropreson (2004) found that students who were socially shy tended to prefer one-way communication in online discussions, whereas extroverted students actively engaged in two-way communications.

The present study failed to show many statistically significant associations between individual characteristics and learner preferences for online interactions. This finding implies the existence of other variables that are better predictors of online learner preferences for interactions with instructor, peers, and self. For example, it is quite possible that online learners like to interact more if they feel that they belong to the community and have a sense of ownership. However, determining these predictor variables is beyond the scope of the current study since this dissertation is dedicated to discovering the effects of demographic attributes and personality traits on learner preferences for online interactions of interest. Future research should look into variables such as a sense of community, self-monitoring skills, confidence with technology and accessibility, student maturity, perceived student needs for interaction, and the level of motivation to learn.

Overarching implications

First of all, this study demonstrates that online learners like to engage in all three types of interactions: learner-instructor, learner-learner, and learner-self interactions. Their preferences for these interactions decline in the order of interacting with instructors, peers, and self. This finding is consistent with Monson's discovery (2003) that learner-instructor interaction was perceived as more important than learner-learner and vicarious interactions. On the other hand, Monson found that online learners perceived vicarious interactions as more important than learner-learner interactions. In contrast, this study showed that online learners' preferences for learner-learner interaction exceeded their preferences for learner-self interaction. Although perceptions of importance and one's preferences are two somewhat different concepts, considering vicarious interaction as a part of learner-self interaction, the inconsistency of the findings on this topic may indicate the effects of the subject field (i.e., an online MBA program) on the preferences for learner-learner and learner-self interactions.

The current study relied exclusively on online MBA students. Most, if not all, MBA courses had team-based learning activities, meaning that the students were often separated into teams when completing various learning tasks. Thus, in comparison with students in other subject areas, the MBA students in this study might perceive learner-learner interaction as relatively more prevalent and important than learner-self interaction. Therefore, similar studies in different contexts should be conducted in the future to reaffirm this finding.

The relative gap analyses of preferences for and experiences of the three types of interactions suggested that the gaps increased in the order of learner-instructor, learner-learner, and learner-self, indicating that the current practice in terms of learner-instructor interactions correlated well with learner preferences compared to those in learner-learner and

learner-self interactions. A practical implication of this piece of information is for online practitioners to encourage more learner-learner and learner-self activities in the future.

Second, within learner-instructor interactions, online learners most preferred to have prompt feedback, asynchronous lectures, academic progress checks, instructors participating in class-level discussions, and regular office hours for consultation. They do not prefer synchronous lectures with instructors. Instead, they want instructors to conduct synchronous Q & A sessions with a manageable number of students instead of the entire class. The relative gap analysis of learner-instructor interaction activities further indicates that online instructors should monitor individual student progress more closely than what has been done at the current stage. The implication of these findings definitely presents challenges to online teaching.

While it is important to accommodate student needs at first, it is also critical to consider the limited time of instructors. How practical is it for instructors to do several Q & A sessions with different groups of students on a given topic? And how realistic is it for online instructors to monitor individual student progress when the class size is large? Might it be possible to find a balancing point that accommodates the needs of both parties? Contextual information is an important factor in instructional design. Different instructional methods should be utilized for different class sizes. For a large class, instructors might consider offering more asynchronous Q & A sessions, rather than offering synchronous ones. Jonassen et al. (1995) pointed out that asynchronous communication not only generates greater learner-instructor communications, but also enables the social construction of knowledge among learners. If synchronous sessions are offered once in a while, the participation should be voluntary and the discussions should be archived for those who are

not present. Since it becomes extremely difficult to track individual academic progress in a large class, instructors might want to assign more team work and check student progress at the team level.

Third, within learner-learner interaction, online students most preferred to share information with peers, next most preferred to engage in discussion and collaboration, and least preferred to engage in role-based activities. However, the relative gap analysis on their preferences for and experiences of the learner-learner interaction activities revealed that role-based activities had the largest gap. Such a gap indicated that the current use of role-based activities in this particular program was far from what students desired. Follow-up interview data confirmed that students perceived role-based activities as effective learning strategies and wanted to have more role-based activities in general.

At the same time, learners did not express high preferences for role-based activities as compared with sharing information and team-based activities, since they felt that engaging in role-based activities took extensive time and energy from individuals. The dilemma of hoping to have productive learning experiences but not wanting to spend much time on the learning task is consistent with what others have labeled as "satisfying performance" (Weinberger, 2003). One critical concern of this phenomenon is its impact on the program quality. If students are satisfied with just meeting the minimum or "good enough" criteria instead of optimizing the learning outcomes, are the online programs really doing the job that they are supposed to do? Although there is a growing tendency to treat education as a business (Bates, 2000, p. 6), the ultimate purpose of online learning programs is to provide education in a timely fashion to those who need it most in an effective way. A possible message from this research finding is that simply meeting learner preferences for various

learning activities is not enough to establish a high quality online program. While it is important to accommodate online student needs related to flexibility and convenience, it is equally important to offer valuable learning experiences for students and establish a sustainable long-term program. Therefore, online practitioners should look beyond present preferences and experiences, and continue to find strategies that can optimize student learning outcomes.

Another thing worth mentioning in learner-learner interaction is the finding related to class-level discussions. Students did not welcome class-level discussions mainly because of the large class size, duplicated postings, and unclear instructions. Class-level discussion is essential for knowledge sharing and knowledge building. Since it is the most frequently used interaction activity, students suggested a number of ways to improve its effectiveness. For example, they proposed dividing up the class into a few groups, setting up clear rules and expectations for the student postings, and increasing professors' active participation in such discussions. In order to avoid repetitive postings, instructors may encourage students to read others' postings first and add additional insights to what has been posted. While advocating this rule, it is also critical to align the assessment mechanism with it. For example, an online instructor might ask students to read all postings, but displaying only a limited number of high quality postings for each academic topic. To ensure everyone read what had been discussed in class forums, instructors may require students to submit a reflection paper once in a while to demonstrate how much they have learned from the discussions. In other words, if the class size is large, learner-self interaction should be increased.

Fourth, within learner-self interaction, online learners most preferred to use what they had learned in real life situations. Reflecting on what they had learned, summarizing key

points of major topics/discussions, having opportunities to solve problems individually, and reading each other's forum postings were the next preferred learner-self interaction activities. Engaging in these self-interactive activities helped students internalize the knowledge, made the learning outcomes more visible, and helped students solve at-work issues. The relative gap analysis on preferences for and experiences of learner-self interactive activities indicated that most of these self interactive activities were not sufficiently encouraged in online courses. Although many argued that learner independence and personal responsibility are two important characteristics of adult distance learning (Holmberg, 1983; Keegan, 1990), it is an instructor's job to find strategies to deepen online learner understanding of the subject matter. The effectiveness of online courses can significantly improve if instructors encourage students to engage in self-reflective activities.

Fifth, certain individual characteristics should be considered while designing an online course. Current research found that age is positively related to learner preferences for learner-self interactions, indicating that older online learners prefer to have self-reflection activities on what they have learned more than do younger learners. A practical implication of this finding is for online educators to be more sensitive to the needs of older online learners and be responsive to their questions and concerns.

This study also found that online learners who were married and raising children were less enthusiastic about learner-learner interactions than those who were married with no children. Raising children often involves heavy family responsibilities and it is easy to understand why people with kids do not prefer those activities that take more time and effort. Online educators should take this piece of information into consideration while designing online courses. If there are many students who have heavy family responsibilities, the

instructor might carefully select class activities that require peer interactions. In such a case, individual work with information sharing could be used more.

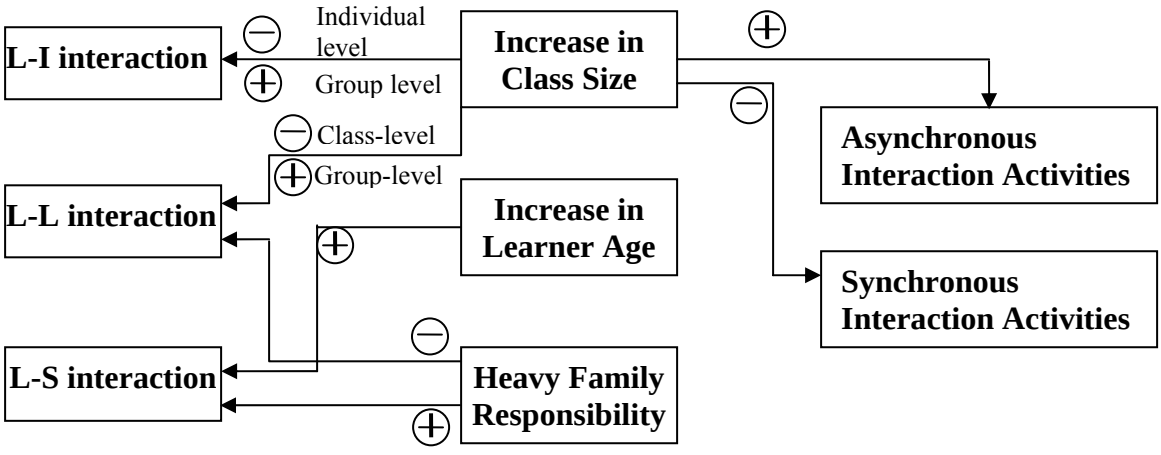
The current study also found that gender, number of previously taken online courses, work status, and personality traits have little or no effect on all three types of interactions. Follow-up interview data suggested that some of these individual differences, specifically the personality trait differences among individuals were reduced in online learning environment. Students who are not used to speaking out in public tend to actively participate in online forums, thus minimizing the effects of personality trait differences on such interactions. Therefore, when designing an online course, practitioners should keep in mind that gender, work status, the number of prior taken online courses, and personality trait differences do not have significant influences on online interactions. However, this does not mean that online practitioners should ignore individual differences since a wide range of intelligences, interests, and strengths exist within a class population. Practitioners should continue to look for teaching strategies that can be incorporated to meet diverse student needs.

Finally, multiple regression analysis indicated that gender, age, prior online courses taken, marital status, job status, and personality traits only explained a small portion of the variance in learner preferences for interactions (4.5% ~ 7.9%). Although there are a number of statistically significant models determined from the regression analyses, they should be interpreted with caution due to the small amount of variance explained. The smaller R-squares imply the existence of other variables that are better predictors of online learner preferences for learner-instructor, learner-learner, and learner-self interactions. Future research should look into variables, such as a sense of community, self-monitoring skills,

confidence with technology and accessibility, student maturity, perceived student needs for interaction, level of motivation to learn, etc.

Although rapid development of media technology is frequently upgrading the way online learning interaction happens, interaction does not simply occur; it has to be intentionally designed into the learning process (Berge, 1999, Liaw & Huang, 2000; Smaldino, 1999). Determining the right mix between asynchronous and synchronous components, and between team and independent learning activities remains a challenge (Anderson, 2002; Daniel & Marquis, 1988). The findings and implications discussed above indicate that the challenge resides in the fact that online course design is a dynamic system. Design of online class interactions should consider multiple factors such as class size, individual differences, learner experiences and preferences, and learners' time and energy. I use the diagram below to illustrate this point and conclude this section, hoping it will prompt further discussions in the related area of online interaction.

Diagram 1: Implications for designing online interactions



⊕ : Increase needed
⊖ : Decrease needed

Limitations of the study

Significant effort was made to develop the survey instrument by synthesizing the interactive instructional activities from the literature, enhancing the instrument content and face validity through an expert review process, and conducting a pilot study to increase internal reliability and item variability. However, it is important to note that the synthesized instructional activity list may not include all the useful activities that can promote online course interactions. There could be other interactive teaching and learning activities that were left out either because the researcher did not know of their existence or because creative activities could occur later with the development of new technologies. In any case, while the findings regarding which activities are most often used and which are preferred by learners can provide valuable insights, online practitioners should also look for other instructional strategies which this study failed to address.

The current study is conducted with online MBA students at one educational institution only. Although efforts have been made to ensure that subjects of this study are representative of the online student body within the program, findings from this one program are not necessarily generalizable to all other online adult learning situations. Similar studies in different contexts are needed to verify the external validity of the current study.

This is a study about preferences. The findings of this research are based on participant perceptions rather than the ultimate value or concrete effectiveness of the researched topic. While such psychological-state research is important, one limitation is that the findings do not necessarily translate into practical guidelines. For example, student preferences for certain learning activity may not necessarily mean that this activity is more

effective and better than other activities in terms of the learning outcomes. Therefore, results of this study should be used as a reference only, rather than as proved guidelines.

Recommendations for further research

While the present study generated many interesting results, it was still exploratory in nature and should be seen as a launching point for future research in the field of online interaction study. As mentioned earlier, this study did not find many statistically significant associations between individual characteristics and learner preferences for online interactions, thereby indicating the possible existence of other variables that will explain more variances of online learner preferences for interactions. Several potential questions for future research are proposed below.

First, many students commented that how much interaction they want to have seems to depend on whether there is such a need. Future research should look into the possible relationships between preferences for each type of interaction and the need for these types of interactions to see how much of the variance of preferences for interactions can be explained by student perceptions of the need for interaction.

Second, although work status failed to demonstrate any significant association with preferences for interactions, student interview data suggested that workload could be something to consider for similar research in the future. One important thing to keep in mind is that work status cannot represent work load. The level of work demand and the number of work hours per week can be quite different among different types of full-time jobs.

Third, the individual characteristics in this study only explained a small portion of variance in learner preferences for interactions, thus indicating the existence of other variables that could better predict learner preferences for online interactions. Variables such

as sense of community, confidence with technology, learning motivation, and self-monitoring skills may be worth examining in future research.

Finally, this was a study of perceptions and preferences. Although literature suggested that meeting adult learner preferences for learning methods could enhance their learning outcomes, it was still unclear whether this was true in an online learning environment. Since one of the findings of this study indicated that online students preferred certain activities just because they could meet their needs of satisfying performance rather than maximizing performance, future research should take learning effectiveness into consideration. What will happen if student preferences for certain instructional activities are met in online learning? Will it increase their overall course satisfaction? Will it enhance learning outcomes?

Conclusions

People often choose to learn online because of its flexibility and convenience. This study raised the concern that most online learners aim to reach the minimum expectations instead of making efforts to optimize learning outcomes. As a result, many may feel that they are not learning what they are supposed to learn, especially in comparison with their traditional counterparts. While accommodating typical online learner needs for flexibility and convenience, ways to enhance learning outcomes becomes a major concern of current online learning practices. Meeting learner preferences for learning activities definitely serves as a starting point for delivering a satisfactory educational experience for busy working professionals who choose to learn at a distance.

Practitioners may refer to the findings as well as the implications of this study when designing their online courses. However, it is critical to point out that we need to continue

investigating factors for promoting effective online interactions and engagement, and help students achieve their goals in a timely and rewarding fashion. While there remains much to be examined and explored in the field of online education; Interaction will undoubtedly be a central component of all these endeavors. How we interact effectively in online teams or support situations, who we decide to interact with, what delivery mechanisms and tools can support such interaction, and what are valuable pedagogical selections of online instructors and instructional designers will be topics of high interest both in the coming decade and certainly far beyond. Online environments are not going away. Knowledge we can gather to enhance teaching and learning within them should be among the highest priorities of most institutions of higher education.

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Appendicies

Appendix A – Follow Up Interview Questions

1. Can you tell me first approximately how many online courses have you taken in the past?
2. How much interaction do you want to have with your online instructor? Do you hope your online instructors to keep in touch with you on a daily basis? How much time are you willing to put in interacting with your online instructor?
3. Do you like to engage in class level discussions? Do you think online instructors should require everyone to read all the postings in class level discussions before posting your own thoughts? Earlier research indicated that online students do not prefer to have class-level discussion. Do you agree? Do you think it is important to have class level discussions? If so, what do you suggest to improve its effectiveness?
4. Do you think it is a good idea to form a new team for each group project? How many teammates do you think will work the best in online collaboration? And Why?
5. How often do you have synchronous small group meetings and what technology do you use for these meetings? Which communication method do you think worked best, and why?
6. Have you encountered any problems with synchronous communications before? Which part of an online course should be synchronous and how much synchronous is appropriate? (Synchronous lectures, discussions such as chat, instant messenger, conference calls, etc.)
7. Have you experienced taking roles (playing an assigned role) in online class activities such as taking a role in a debate team, being a coordinator or facilitator of a team, etc.? Do you think it takes extra effort to engage in such role based activities? Do you think having such role assignments are beneficial to learning online?
8. Do you usually finish required readings before each lecture? Do you develop your questions before you look at the lecture notes and/or others' discussions? Just describe your general learning pattern. What do you think is the most effective way for you to learn?
9. Do you like to reflect on your own? Do you often remind yourself to do so?
10. Do you get chances to study at work? Or do you usually study at home after work?
11. Do you feel your job is demanding and takes lots of time and energy? How many hours do you work per week in general? Do you think the pressures of work in your current position add challenges to your online learning process?
12. Are you married? Do you have children?
13. Do you like to engage in individual problem-solving activities? Why? Is it because you are experienced and thus become confident that you can do a good job independently? Or is it because you think solving problems individually is more effective than working in a group? Or do you simply enjoy working independently?
14. Do you get lots of interactions with others in your work, at home, and with friends? Do you think it is important to interact with your online classmates? Which kind of interaction is important (course content-related, social, or other)? Do you like to interact with your online classmates? How much interaction do you think you can afford to have with your online classmates each week in terms of time and energy?

15. Do you like the in-residence week? Do you think a week in-residence is too short, too long, or just about right? Do you think once a year in-residence works well for you?
16. Do you think your personality traits are related to the way you interact with others online? Can you provide a couple examples on how they may play a role in your online learning?
17. Do you see any factors that can affect your preferences of interacting with your online instructor and peers? For example, do you feel technology gets in the way of interacting with others sometimes? If so, please describe in detail.
18. Do you feel that you are motivated to learn? Have you ever thought of dropping out of the program? Do you think getting this MBA degree will provide opportunities for promotions or a better job?
19. Do you feel that you are a Kelley MBA student most of the times? Do you feel that you have a learning community in general?
20. Overall, do you say that you are satisfied by your online learning? Do you have any suggestions for improving our current online courses? How do you think it can be enhanced to meet your needs?

Appendix B – Experiences Survey

Learner Experiences of Interaction Activities Questionnaire

This questionnaire has two parts. First two pages of this survey are to investigate the interactive teaching and learning activities that you have experienced in your online learning environment. Second three pages are to ascertain your preferences for interactive teaching and learning activities in online learning. Your responses will help evaluate our teaching strategies and will provide valuable insights for promoting online course interaction in the future. Your responses will be kept confidential and presented only in aggregate form. Please choose the most appropriate option for each question.

Section 1: ***Learner-instructor interaction activities***

	In my online courses, the instructors	Never	Rarely	Sometimes	Often	Always
1	use synchronous lectures that allow real-time questioning and responding.					
2	use asynchronous lectures (e.g., post lecture notes, video, power point slides etc. online) that involve delayed questioning and responding.					
3	have regular office hours for consultation (e.g. using multiple options such as phone, chat, email etc.)					
4	participate in group-level team discussions.					
5	Participated in class-level discussions.					
6	check on student progress regularly (e.g., reading and giving feedback on student academic journals, sending emails to see how students are doing).					
7	grade on student responses to discussion questions.					
8	provide prompt feedback.					
9	have social communication with students.					

Section 2: ***Learner-learner interaction activities***

	My online courses	Never	Rarely	Sometimes	Often	Always
10	have small group asynchronous discussions among students.					
11	have class-level large group asynchronous discussions.					

12	have synchronous chat sessions for students to engage in real-time discussions.					
13	have team-based collaborative projects and assignments.					
14	utilize task roles (such as discussion moderator, team leader, etc.) to individuals.					
15	have student online debating team activities (e.g., debating as teams).					
16	have online role-playing activities (e.g., playing different roles in a case).					
	In my online courses, I	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
17	get feedback from my peers.					
18	give feedback to my peers.					
19	share course-related information and resources with my peers.					
20	have informal chats with peers where we share experiences and beliefs etc.					

Section 3: ***Learner-self interaction activities***

	In my online courses, we	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
21	reflect on what they have learned.					
22	Are encouraged to utilize what we have learned in real life situations (e.g., on the job).					
23	to read over each other's discussions (both on-going and archived discussions) in the online forums.					
24	prepare questions before the next class or academic topic.					
25	are given individual problem-solving opportunities such as responding to questions independently.					
26	summarize “take away” key points of major topics or discussions.					
27	write critiques or reflection papers about key course topics or concepts.					
28	keep an electronic study journal (e.g., weekly					

entries in a personal blog).					

Describe Yourself: Be assured that your responses to this survey are strictly confidential. The information below is asked only to track for systematic differences in the data.

Your gender: ☐ Female ☐ Male

Marital status: ☐ Married & raising children ☐ Married & no children
☐ Single parent ☐ Single

Work status: ☐ Full-time employed ☐ Part-time employed
☐ Not currently employed

Your age: _____

Number of online courses you have taken: _____

Appendix C – Preferences Survey

Learner Preferences of Interactive Activities Questionnaire

This is part II of the survey. Please note that the rating system in part II is different from those in the part I. Please rate your preferences for online interactive activities below on 5-Likert type scale from "strongly disagree" to "strongly agree".

Section 1: ***Learner-instructor interaction activities***

	I prefer my online instructors to	Strongly disagree	disagree	Neither agree nor disagree	agree	Strongly agree
1	use synchronous lectures that allow real-time questioning and responding.					
2	use asynchronous lectures (e.g., post lecture notes, video, power point slides etc. online) that involve delayed questioning and responding.					
3	have regular office hours for consultation (e.g. using multiple options such as phone, chat, email etc.)					
4	participate in group-level team discussions.					
5	participated in class-level discussions.					
6	check on student progress regularly (e.g., reading and giving feedback on student academic journals, sending emails to see how students are doing).					
7	grade on student responses to discussion questions.					
8	provide prompt feedback.					
9	have social communication with students.					

Section 2: ***Learner-learner interaction activities***

	In my online courses, I prefer to	Strongly disagree	disagree	Neither agree nor disagree	agree	Strongly agree
10	have small group asynchronous discussions among students.					
11	have class-level large group asynchronous discussions.					
12	have synchronous chat sessions for					

	students to engage in real-time discussions.					
13	have team-based collaborative projects and assignments.					
14	utilize task roles (such as discussion moderator, team leader, etc.) to individuals.					
15	have student online debating team activities (e.g., debating as teams).					
16	have online role-playing activities (e.g., playing different roles in a case).					
	In my online courses, I hope to	**Strongly disagree**	**disagree**	**Neither agree nor disagree**	**agree**	**Strongly agree**
17	get feedback from my peers.					
18	give feedback to my peers.					
19	share course-related information and resources with my peers.					
20	have informal chats with peers where we share experiences and beliefs etc.					

Section 3: ***Learner-self interaction activities***

	In my online courses, I prefer	**Strongly disagree**	**disagree**	**Neither agree nor disagree**	**agree**	**Strongly agree**
21	to reflect regularly on what we have learned.					
22	to utilize what we have learned in real life situations (e.g., on the job).					
23	to read over each other's discussions (both on-going and archived discussions) in the online forums.					
24	to prepare questions before the next class or academic topic.					
25	to be given individual problem-solving opportunities such as responding to questions independently.					
26	to summarize “take away” key points of					

	major topics or discussions.					
27	to write critiques or reflection papers about key course topics or concepts.					
28	to keep an electronic study journal (e.g., weekly entries in a personal blog).					

If you prefer any other interactive instructional activities in your online courses, please write them down in the space below:

_____

_____

___

Describe Yourself: Here are a number of personality traits that may or may not apply to you. Please circle a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

	I see myself as:	Strongly Disagree	Disagree moderately	Disagree a little	Neither disagree or agree	Agree a little	Agree moderately	Strongly Agree
1	Extraverted, enthusiastic							
2	Critical, quarrelsome							
3	Dependable, self-disciplined							
4	Anxious, easily upset							
5	Open to new experiences, complex							
6	Reserved, quiet							
7	Sympathetic, warm							
8	Disorganized, careless							
9	Calm, emotionally stable							
10	Conventional, uncreative							

Note: We would like to conduct a follow up telephone interview in the fall semester in order to deepen our understanding on the student preferences for online activities that can enhance online class interactions. If you are willing to help us on such online course design issues, please leave your e-mail address below. We will randomly select about 10-15 people from the volunteers to conduct a 45-minutes telephone interview. The interviewees will get a $30 value gift in the end of the fall semester. Your e-mail address

will not be revealed to any others except one researcher in Kelley Direct Online MBA program who will contact you to set up the interview time. Thank you!

Your e-mail address is: _____

CURRICULUM VITAE

EDUCATION

05/2006 **Indiana University** **Bloomington, IN, USA**

Ph.D. in Education: Concentration in Instructional Systems Technology

Minor: Organizational Behavior and Business Management

05/2002 **Indiana University** **Bloomington, IN, USA**

M.S. in Education: Concentration in Instructional Systems Technology

07/1993 **Central University of Nationalities** **Beijing, CHINA**

B.S. in Computer Science

UNIVERSITY TEACHING EXPERIENCE

01/2003 to 05/2003 **Indiana University** **Bloomington, IN, USA**

Adjunct Instructor for a distance learning course – *Computer Mediated Learning*, an intermediate level graduate course on design, development, and evaluation of computer-mediated learning programs for online Master's students majoring in Instructional Systems Technology

- Co-taught with Lauryl Lefebvre for the design, delivery, and management of the course.
- Number of students enrolled: 14

08/2002 to 12/2002 **Indiana University** **Bloomington, IN, USA**

Teaching Assistant for residential *Computer Mediated Learning*, offered for residential graduate students majoring in Instructional Systems Technology

- Assisted Dr. Ted Frick in teaching, project team management, and advising
- Number of students enrolled: 19

K-12 TEACHING EXPERIENCE

09/1993 to 12/1999 **Bayi Secondary School** **Beijing, CHINA**

Computer Literacy teacher for 7th through 12th grade students

- Content included operating systems (DOS and Windows), office applications (word processing, database, etc.), e-mailing, discussion forums, and programming (BASIC, PASCAL).
- Number of students enrolled each semester for my class: 100-600
- Age of students: 12-18

09/1995 to 07/1996 **Hepingmen Elementary School** **Beijing, CHINA**

Computer Literacy teacher (part-time) to 1st through 6th grade students.

- Number of students enrolled each semester for my classes: 240

- Age of students: 6-12

ADULT-TRAINING EXPERIENCE

07/2004 to present **Kelley School of Business, Indiana University**

Bloomington & Indianapolis, IN, USA

Instructional Consultant and Research Fellow (Half-Time)

- Currently evaluating a number of online MBA courses and designing several online training modules (both self-paced and instructor-led) for faculty development in Kelley Direct Online Programs.

08/2001 to 8/2005 **Indiana University** **Bloomington, IN, USA**

Graduate Assistant to the Web Director for School of Education,

- Conducted a series of workshops for faculty and staff on how to generate and update Webpages for their teaching and working. Content focus included Web publishing process, Dreamweaver, Course Builder, IU Oncourse, Macromedia Contribute, Course Syllabus Update Tool, and other in-house Web management tools.
- Conducted a series of individual staff (Website content providers) trainings on how to use EdWeb Page Maker Tools to update and maintain corresponding Websites.

08/1997 to 8/2000 **iEARN** **Multiple Countries**

National Director of International Education And Resource Network (iEARN)

- Presented teacher professional development workshops in China, South Africa, United Kingdom, and USA on use of iEARN online resources, such as Interactive Forums, Professional Development Courses, and Project Databases.
- Invited by the Soros Foundation (1998) to Ulaanbaatar, Mongolia to train secondary school teachers on how to carry out project-based collaboration using available Internet resources.
- Worked with MIT-CETI (China Educational Technology Initiative) group to train Chinese teachers & staff on Internet usage and school webpage design.

RESEARCH EXPERIENCE

07/2004 to present **Kelley School of Business, Indiana University**

Bloomington & Indianapolis, IN, USA

Instructional Consultant and Research Fellow

- Conducted faculty/student interviews, surveys, and content analysis of several dozen online MBA courses in terms of course design features that could promote course interactions, student satisfaction, and learning outcomes. A total number of 27 faculty and 112 students

participated the study and 27 online courses were analyzed.

- Designed and currently conducting an experimental study that examines the relationships among team structure (functional teams vs. divisional teams), cognitive styles, coordination behaviors, and task complexity in virtual team collaboration context. An estimated number of 240 online MBA students will participate in this study.
- Currently conducting a research study that examines which instructional strategies and activities can promote online class interactions, and also looks at possible variables influencing adult student preferences toward these interactive instructional activities. An estimated number of 600 online MBA students and alumni will be invited to participate in this research study.

01/2003 to 05/2003 **School of Education, Indiana University**

Bloomington, IN, USA

- Conducted a case study on an online graduate-level course in Instructional Systems Technology department. Using both quantitative and qualitative methods, closely examined the instructional design, development and evaluation process of this online course.

09/2001 to 12/2001 **School of Education, Indiana University**

- Carried out a cost-benefit analysis of distance education program at Instructional Systems Technology department. Based on the collected data, recommended a number of suggestions for decreasing program cost and increasing annual revenue.

WEB SITE MANAGEMENT AND PROGRAMMING EXPERIENCE

08/2001 to 08/2005 **Indiana University** **Bloomington, IN, USA**

Graduate Assistant to the Web Director of School of Education

- Closely worked with the Web Director, Dr. Ted Frick, to program in-house Web development and maintenance tools including EdWeb Page Maker, Faculty and Staff Profile updater, Course Catalog updater, Course Syllabus uploader, and Job Service tool
- Computer languages used for programming these tools include PHP, XML, and MySQL.
- Worked with two colleagues to design and develop the current School of Education Website template using Cascading Style Sheets (CSS) and HTML
- Conducted a number of Website usability tests for various units in the School of Education
- Periodically managed and trained 20-30 Webmasters in various departments and offices at the School of Education

- Designed and produced a number of job-aids to assist Webmasters and faculty members in using both in-house and commercial Web tools
- Conducted a number of Web skill development workshops for faculty and staff at the School of Education

09/2001 to 12/2001 Irish People Newspaper San Diego, CA, USA

Core programmer of the search engine for Irish People Newspaper Website

- Used Perl programming language to design and develop a Website search engine by which customers could use to locate any archived news online

09/1993 to 12/1996 Bayi Secondary School Beijing, CHINA

- Designed and programmed a number of computer-assisted instructions for high school physics and math classes, and middle school geography classes. Primary programming language was Pascal.
- Used Dbase III database language to develop student academic record system and human resource management tool.

OTHER WORK EXPERIENCE

07/1999-07/2000 iEARN-China Beijing, CHINA

As the National Director of iEARN-China, organized and hosted the 7th Annual iEARN Conference and 4th Annual iEARN Youth Summit in Beijing, China from July 16-20, 2000. A total number of 465 participants from 63 countries attended this conference.

07/1998 to 09/1998 iEARN-USA New York City, USA

Closely worked with a professional fund raiser in New York to raise funds for iEARN-China. Met with various levels of managers and directors in American International Group (AIG), Microsoft, IBM, Compaq, U.S. Department of Education, and UNESCO.

PUBLICATIONS

- Su, B., Bonk, C. J., Magjuka, R., Liu, X., Lee, S. H. (2005). The importance of interaction in web-based education: A program-level case study of online MBA courses. *Journal of Interactive Online Learning, 4*(1). http://www.ncolr.org/jiol/issues/PDF/4.1.1.pdf
- Su, B. (2005). Examining Instructional Design and Development of a Web-based Course: A Case Study. *International Journal of Distance Education Technologies*, 3(4), 62-76.
- Su, B. (2005). Change Perspectives on the No Child Left Behind Act. *International Journal of Educational Reform*, *14*(1), 45-53.
- Frick, T., Su, B., & An, Y. (2005). Building a Large, Successful Website Efficiently through Inquiry-Based Design and Content Management Tools. *TechTrends*, *49*(4), 20-31.

- Lee, S.H., Bonk, C.J., Magjuka, R.J., Su, B., & Liu, X. (in press). Understanding the dimensions of virtual teams. *International Journal of E-learning*.
- Liu, X., Bonk, C.J., Magjuka, R.J., Lee, S.H., & Su, B. (2006). Exploring Four Dimensions of Online Instructor Roles: A Program Level Case Study. *Journal of Asynchronous Learning Environments*.
- Su, B. (2004). Dual-Mode Programs: A Quagmire for Distance Education Development? *Educational Technology*, 44(5), 50-54.
- Su, B. & Shi, M. (2004). A New Model for Curricular Integration of Computer Technology in China. *Asia-Pacific Cybereducation Journal*, 1(1), 19-28.
- Liu, X., Lee. S. H., Bonk, C. J., Magjuka, R., Kim, K., J., Liu, S., Zhai, M., Su, B., Shi, S., Wise, A., & Doo, M.. (2004). Online facilitation in online MBA courses. *Proceedings of the E-Learn Conference 2004-World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*. Washington, DC, USA
- Kim, K., Liu, X., Lee, S., Bonk, C., Magjuka, R., Su, B., Liu, S., Zhai, M., Wise, A., Shi, M. (2004). Facilitation and Motivation in Online MBA Courses. *Proceedings of the Association for Educational Communications and Technology*. Chicago, IL, USA.
- Su, B. (2003). A Problem-based Approach for E-learning in Corporate Settings. *Proceedings of the Association for the Advancement of Computing in Education: World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education (E-Learn).* Phoenix, AZ, USA.
- Frick, T., Dodge, T., Liu, X., Su, B. (2003). Is a Web site or E-Learning Product Working Well? How Many Users Should You Test? *Proceedings of the Association for Educational Communications and Technology*. Anaheim, CA, USA.
- Parker, P.. ,Kapke, G., Doo M., Subude, Ludwig B., & Hoogstraat A. (2001). Cost-Benefit Analysis: Case Study of the Distance Master of Science Program in the Department of Instructional Systems Technology, Indiana University. *Proceedings of the Association for Educational Communications and Technology.* Atlanta, GA, USA

AWARDS AND GRANTS

2000-2004

Chancellor's Fellowship at Indiana University

2001

U.S.-China Youth Exchange pilot project management grants from the U.S. Department of Education

2000

Global Education Model School project management grants

1999

Global Educator Team grants for "New Frontiers in Learning" International Conference in United Kingdom

1996 - 2001

Copen Family Foundation grants for Annual International Education and Resource Network Conferences in Budapest, Hungary (1996); Barcelona, Spain (1997); Chattanooga, TN (1998); Cape Town, South Africa (2001)

1998

Soros Foundation teacher training grants to help secondary school teachers for developing project-based online collaboration in Ulaanbaatar, Mongolia

1997

2B1 Foundation travel grants for "World Workshops on the Digital Future of Children, Learning and Developing Nations" conference hosted at MIT Media Lab in Massachusetts, USA

1994-1996

Excellent Young Teacher Award in Haidian District of Beijing, China

1992-1993

Excellent student award and scholarship at Central University of Nationalities in Beijing, China

1989

National College Entrance Examination Highest Score Award in Inner Mongolia Province (among students who study in Mongolian)

SERVICE

September 2004 to May 2005

The Student Representative for Recruitment, Admission and Financial Aid Committee at School of Education, Indiana University.

January 2004 to May 2004

Reviewer for the Change Division of Association for Educational Communications and Technology 2004 conference proposals.

September 1998 to present

Assembly Member of the International Education And Resource Network (iEARN).

September 1991 to July 1993

President for Social Activities – in Computer Science department of Central University of Nationalities, China

PROFESSIONAL ORGANIZATIONS

- Member of the Association for Educational Communications and Technology.

- Member of the American Educational Research Association.
- Member of the International Society for Performance Improvement.
- Member of the International Education And Resource Network

LANGUAGES

Mongolian (native), Chinese (fluent), English (fluent), Japanese (intermediate).