EXPLORING STUDENTS' BELIEFS ABOUT TEACHING AND LEARNING IN RELATION TO THEIR PERCEPTIONS OF STUDENT-CENTERED LEARNING ENVIRONMENTS: A CASE STUDY OF THE *STUDIO EXPERIENCE*

by

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(Under the Direction of Robert Maribe Branch)

ABSTRACT

Student-centered learning environments place students in the center of the learning process, requiring their active participation in knowledge construction. Considering that most students have experienced teacher-directed instruction for much of their education, student-centered learning environments require significant changes in students' notions of teaching and learning and in their expectations of their classroom role. Due to significant difference between student-centered learning environments and teacher-directed classrooms, students may feel uncomfortable and find themselves ill-prepared to learn in the new environments. This case study explored students' beliefs about teaching and learning and how their beliefs influenced their experiences in a student-centered learning environment in a graduate program. This study also examined whether students' beliefs and perceptions changed throughout the study as a result of their experiences in the learning environment.

This study was conducted in the *Studio* courses in the Instructional Design and Development program. The *Studio*, employing a constructivist, student-centered learning environment, consists of a sequence of three required courses that focuses on educational

multimedia design and development tools for students in the master's program. Eleven graduate students were selected from among the three *Studio* courses in this qualitative case study. Data were collected using in-depth interviews, students' personal documents, and classroom observations during a 16-week semester. The findings indicated that students' background knowledge and skills, as well as their beliefs about teaching and learning, were important in determining their readiness for the *Studio*. Readiness for the courses influenced students' perceptions of and reactions to the learning environment. The findings of this study also indicated that the student-centered learning approach was worthwhile in that students were able to be exposed to a different approach to teaching and learning, and thus, become more flexible and adaptive to new ways of teaching and learning.

This study showed that successful implementation of a student-centered learning environment depends on how and when support and guidance is provided for student learning. Therefore, this study suggests that teachers and educational practitioners should acknowledge students' individual differences, provide personal support and guidance, use technology to leverage student learning, and encourage students to become self-directed learners.

INDEX WORDS: Student beliefs, Belief about teaching and learning, Conception of teaching and learning, Student perceptions, Student-centered learning, Student-centered learning environments, Self-directed learning, Constructivist learning environments

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DEDICATION

To

My parents, my wife, and my son

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CHAPTER I

INTRODUCTION

In the fall semester of 2003, I took the first course of the *Studio Experience* (Rieber, 2000) within the Department of Instructional Technology at the University of Georgia. The *Studio Experience* comprises three required courses designed to teach educational multimedia design and development tools to students in the master's program. Rather than teaching how to use these tools in a step-by-step manner—which is a typical way of teaching computer tools— the *Studio* courses provided a constructivist learning environment where students could gain knowledge and skills related to various multimedia tools by designing and developing educational artifacts to solve instructional problems situated in everyday practice and by reflecting on their experiences. Due to this new and redesigned constructivist approach, I felt confused and did not fully understand what I needed to do at the beginning of the course. I was accustomed to teacher-directed instruction—an instruction model where teachers tell students what to do and how to do it— and thus I kept waiting for direction from the teacher until the middle of the semester. I finally realized that the course was different from previous courses I had taken, both in terms of beliefs about teaching and learning and my roles and responsibilities as a student.

My learning experience was echoed two years later while I was a teaching assistant in the same course. As a teaching assistant, I had a chance to meet several graduate students from the course who had the same feelings and confusions that I had experienced. They asked me what they should do to complete the course and complained about the lack of structure and guidance

in the course, although there were resources and information available to the students. Student-centered approaches to teaching may not be preferable to students who are used to teacher-directed instruction. This experience made me wonder whether students would feel centered in constructivist, student-centered learning environments and how teachers and educational practitioners could help students value the student-centered approaches and benefit from them.

Since the 1990s, the interest in student-centered learning environments has paralleled the increasing interest in constructivist views of learning (Land & Hannafin, 2000). The constructivist view resulted from the limitations of objectivist views about teaching and learning in the knowledge era. The transition from the objectivist view to the constructivist view of learning requires a change in viewpoints regarding teaching, learning, and learning environments. From the constructivist perspective, teaching and learning cannot be explained simply as the transmission and acquisition of knowledge; rather, learning is considered to be an active process for constructing knowledge, while teaching fosters and supports the learning process. Accordingly, a learning environment, from the constructivist viewpoint, is a place where students can have access to resources and construct meaningful knowledge with appropriate guidance and support (Khan, 1997). Therefore, students' construction of knowledge is centered, with teachers guiding and supporting learners in their construction of knowledge; in this sense, this constructivist view requires reconsideration of both students' and teachers' roles in learning contexts.

As the term *student-centered learning* implies, student-centered learning environments place students at the center of learning contexts and accommodate students' diverse individual characteristics in the learning process. Student-centered approaches emphasize students' construction of knowledge through authentic problems or cases situated in practice. Accordingly,

students are expected to play active roles in the learning process, while teachers take on guide or facilitator roles. However, students may have different beliefs about or expectations of teaching and learning because they have been taught mostly in teacher-directed learning environments. The difference in beliefs about teaching and learning may influence student perceptions of student-centered learning contexts and hinder student participation in learning activities and knowledge construction in student-centered learning environments.

There has been little attention paid to students' beliefs, perceptions, experiences, and challenges in such environments (Perkins, 1992). Therefore, this study explored students' beliefs about teaching and learning in relation to their perceptions of student-centered learning environments. Furthermore, this study also examined whether students' beliefs would change through their learning experiences in a student-centered learning environment, the *Studio* courses.

Introduction to the *Studio Experience*

The *Studio* courses, often called the *Studio Experience* (Rieber, 2000), comprise three required courses for students who are pursuing their master's degrees in the Instructional Design and Development (IDD) program. The *Studio Experience* approaches the teaching and learning of instructional design and development and multimedia tools with a constructivist perspective on teaching and learning, or *learning by designing*. The *Studio Experience* was designed based on several core principles, including the following:

> 1) learning is an active process in which each individual constructs meaning, 2) learning is also a social activity founded on collaboration and respect for different viewpoints, and 3) learning is embedded in the building of works that are shared and critiqued by peers. (Rieber, 2000, p. 195)

The *Studio Experience* provides a learning environment in which students learn multimedia design and development tools by applying what they learn to authentic instructional design problems. Instead of teaching how to use tools in a step-by-step manner and what to do with them, the courses help students to construct knowledge and skills while working on individual projects, and later, on authentic instructional projects as part of a group. Through working on individual and group projects and working with students in different stages of the *Studio*, students are gradually exposed to what they are expected to do in practice. Also, they develop their expertise in multimedia design and development tools and become ready to do what they are expected to do outside of the classroom in a professional environment.

Due to the focus on the active process of constructing knowledge and skills, students are expected to be active and to gradually become self-directed learners from teacher-dependent learners. Knowles (1975) describes self-directed learners as those who initiate their learning by analyzing their learning needs, setting learning goals, designing learning plans toward the goals, implementing the plans, identifying resources, and evaluating their learning outcomes based on their needs and goals. While teacher-directed learning expects the learner to be dependent and the teacher to decide what and how the learner should be taught, self-directed learners are responsible for their own learning. For example, students in the beginning *Studio* course should decide what tools they want to learn and how they want to learn the tools. Rather than doing what teachers tell them to complete, students must decide for themselves what they want to accomplish for their individual projects. Because students are not accustomed to self-direction in learning, they may have difficulty adjusting to the *Studio* approach. Therefore, teachers, instead of transferring knowledge to students, should support student learning by providing guidance and resources.

Background

Resnick (1987) identified four differences between learning in school and outside school as part of her presidential address at the annual AERA convention in 1987. First, learning in school focuses on individual performance, while people outside school rely on socially shared cognition; as a result, cooperation and collaboration are valued in everyday life. Second, schooling aims at perfect performance without external supports. However, work outside school encourages people to use cognitive tools which allow people to expand their cognitive capacities and efficiencies. Third, because of strong emphasis on abstract and isolated thinking, school learning makes it difficult for students to connect symbols to events and objects in real world. Finally, school learning focuses on general skills and knowledge, whereas people in everyday life are expected to develop situation-specific competencies. Similarly, Brooks and Brooks (1993) characterized the traditional classroom as being dominated by teacher talk, reliance on textbooks, isolated individual work, devalued student thinking, and fixed knowledge. Thus, Resnick addressed a perceived need to redirect the focus of schooling so that school can be a place where students cultivate intellectual skills such as reflection and reasoning while engaging in problems in everyday practice.

Direct instruction, a typical form of learning in school, based on behavioral principles has been criticized for its learning outcomes (Winn, 1990); it has failed to teach critical thinking and problem-solving skills (J. S. Brown, Collins, & Duguid, 1989). Mandl, Gruber, and Renkl (1996) criticized traditional forms of instruction for not developing professional expertise for students' professional lives. Bereiter (2002) used the *mind-as-container* metaphor to illustrate current problems in educational practices. According to Bereiter, current approaches to learning have been suitable for transmitting fixed knowledge into the mind of people. The metaphor, however,

implies that current educational practices are not adequate for knowledge application in the knowledge society because people do not seem to know when and how to use knowledge in the container. Instead of transmission and acquisition of knowledge, Scardamalia and Bereiter (2006) emphasized *knowledge building* in a knowledge-creating culture. Similarly, Paavola, Lipponen, and Hakkarainen (2004) presented the *knowledge creation metaphor*, reconceptualizing learning as "collaborative processes for developing shared objects of activity" (p. 569). The knowledge creation metaphor emphasizes that learning is not simply the acquisition of knowledge in the knowledge society; rather, learning should produce new objects, such as knowledge, ideas, practices, and artifacts.

When instruction focuses on transmission of knowledge to students without any application to social contexts, knowledge will not necessarily be activated when it is needed, even though students have the knowledge in their minds (Whitehead, 1929). Whitehead called the inactivation problem *inert knowledge*; that is, students cannot transfer what they learn in the classroom to different problem situations (Boldwin & Ford, 1988; Larkin, 1989; Perkins & Salomon, 1988). Therefore, educational researchers and practitioners have pursued alternative learning environments to traditional teacher-directed instruction in order to optimize learning as a way to enhance critical thinking and problem-solving skills in everyday practice.

Mayer (1992) used three metaphors of learning and instruction: learning as response acquisition, learning as knowledge acquisition, and learning as knowledge construction. First, learning as response acquisition is based on a behaviorist perspective and thus focuses on creating situations where learning occurs by responses and reinforcement. Drill and practice is a typical example of this view, and students are regarded as passive recipients. Second, the view of learning as knowledge acquisition concerns organizing and presenting information to help

students process and store it so that they can later retrieve information when it is needed. Within this metaphor, students are viewed as a processor of information and teachers become a giver of information. This perspective is aligned with transmission and acquisition of knowledge associated with lectures, quizzes, and tests. The last metaphor of learning as knowledge construction reflects the constructivist view about learning and focuses on helping students construct meaningful knowledge and understandings. This constructivist view of learning calls for changing the view of learners from passive recipients of knowledge to active constructors of knowledge. The transition to the constructivist view leads to reconsideration of learning as being more student-centered rather than teacher-centered or content-centered.

Constructivism and Student-Centered Learning Environments

The design of instruction is inherently guided by theories of learning that describe the processes of learning and the role of learners in learning environments (Duffy & Jonassen, 1992). Recently, constructivism has gained in popularity and has had a significant impact on instructional theories and practices. Even though there is a gap between theory and practice, and implementation of constructivist learning environments is difficult and challenging to teachers (Windschitl, 2002), constructivism has provided principles and foundations of designing alternative learning environments to teacher-directed learning environments. The core tenet of constructivism is that knowledge is constructed by people rather than transferred to people (J. S. Brown, et al., 1989). Unlike objectivism, which asserts that meanings exist independently of our consciousness, constructivism supports the idea that people construct their knowledge and understandings through interaction with their environments by linking and transforming new information.

Wilson (1996) described a learning environment from the constructivist point of view as "a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem solving activities" (p. 5). While working with authentic problems situated in everyday practice, students construct knowledge through interacting with other people and surrounding environments. Authentic activities and experiences are believed to motivate students to engage in meaningful construction of knowledge and understandings and to empower students to perform what they are expected to do in their professional lives. From the constructivist perspective, learning focuses on *knowledge construction* rather than knowledge acquisition and teaching emphasizes the *facilitation of learning* rather than the transmission of knowledge.

As the constructivist view about teaching and learning has gained popularity, instructional designers have sought to design meaningful learning environments in alignment with the constructivist epistemology. Some of the examples include anchored instruction (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990; CTGV, 1990), problem-based learning (Hmelo-Silver, 2004), constructivist learning environments (Jonassen & Rohrer-Murphy, 1999), open-ended learning environments (Land & Hannafin, 1996), and computer-supported collaborative learning (Koschmann, 1996). These environments are operationalized in the forms of problem-based, case-based, or project-based learning, focusing on knowledge construction through problem-solving practices; it is believed that these alternative learning environments improve students' problem-solving skills outside the classroom. Land and Hannafin (2000) described these environments as student-centered learning environments.

Student-centered learning environments refer to "environments that pay careful attention to the knowledge, skills, attitudes, and beliefs that learners bring to the educational setting"

(Bransford, Brown, & Cocking, 1999, p. 133). Brookfield (1986) noted that "explorations of new ideas, skills, or bodies of knowledge do not take place in a vacuum but are set within the context of learners' past, current, and future experiences" (p. 15). Similarly, student-centered learning appreciates the diverse characteristics of students, such as prior experiences and knowledge, different perspectives, and learning styles. Student-centered environments provide authentic activities and resources so that students can construct knowledge while making sense of meanings and deepening understandings.

Considering that conventional teacher-directed instruction has been based on a positive epistemology (Hannafin, Hill, & Land, 1997), student-centered approaches are significantly different from the conventional methods in terms of their epistemological stances. Student-centered learning focuses on the construction of knowledge or learning embedded in social contexts because it is rooted in constructivist epistemology. The epistemological differences manifest themselves in differences in assumptions and classroom practices. Unlike conventional directed learning environments, or *teacher-centered instruction* (Cuban, 1990), in which instruction is determined by teachers, student-centered learning involves students in the learning process. A sense of authority is given to students over their learning in learning environments where they take responsibility for the construction and application of knowledge (Hannafin & Land, 1997). Goal-Based Scenarios, for example, are instructional approaches that employ a learn-by-doing idea in computer-based learning environments (Schank, Fano, Bell, & Jona, 1993). Goal-Based Scenarios center on problems in domains of students' interests, such as production of TV news show and counseling of clients, and encourage students to achieve goals. While working with authentic problems, students become active participants in the scenario and

learn a set of target skills in the learning environments where external support, resources, and tools are available.

Statement of the Problem

The primary problem with the design and implementation of student-centered learning environments is that there is a significant difference in the notion of teaching and learning and the expectation of students' roles between teacher-directed instruction and student-centered learning. Focusing on learning as knowledge construction and teaching as facilitation of student learning, student-centered learning requires students' active participation in problem-solving activities and knowledge construction. Students' roles in student-centered learning environments are significantly different from their roles in teacher-directed learning environments (Hannafin, Hill, et al., 1997). According to Song, Hannafin, and Hill (2007), there are often misalignments among the expectations, beliefs, and practices of teachers and students. While direct instruction treats students as passive recipients, students in student-centered learning environments are expected to actively make meanings and construct knowledge. However, because students have been taught in teacher-directed classrooms, their beliefs about teaching and learning are likely to be formed through their prior learning experiences in those environments, and their beliefs may hinder students from changing their roles to being more active participants (Brookfield, 1986). Constructivist, student-centered approaches to teaching and learning are inconsistent with what students have experienced in learning contexts and believed about teaching and learning. This problem may cause student disorientation and confusion in student-centered learning environments; accordingly, students are unlikely to be motivated to learn. Given the epistemological change of student-centered learning, it is required that students change their roles and positions from passive recipients to active constructors.

There are various factors that influence the success or failure of student-centered learning, including student orientation to problems, student collaboration, and teachers' roles as facilitators (Brush & Saye, 2000). According to Brush and Saye, students have difficulty dealing with ill-structured problems because they do not have sufficient external guidance, they are overwhelmed by information, and they lack of metacognitive skills. Because of the requirements of student-centered approaches, there are also concerns about students' roles, positioning, cognitive capabilities, metacognition, and abilities to regulate their learning in student-centered learning environments (Hannafin, Hill, et al., 1997; Land, 2000). According to de Jong and van Joolingen (1998), students often fail to motivate and regulate their learning, which is critical for successful learning experiences in those learning contexts; that is, students may not be prepared for the alternative learning contexts. Because most students are accustomed to conventional directed learning, they are not comfortable or well-prepared when they are forced to take responsibility for their own learning (Hannafin, Hill, et al., 1997). Chang and Barufaldi (1999) found that even though students realized the benefits of student-centered learning, some students did not value the approaches. Although being considered as active constructors of meaning in student-centered learning environments, students are not likely to engage in meaningful learning (Wallace & Kupperman, 1997). It appears that students are not accustomed to being the center of their learning contexts. Therefore, teachers and instructional designers should consider strategies by which students are guided to active participation in the learning process in student-centered learning environments.

Student-centered learning is "demanding, and can be disorienting, even unsettling, for those engaged in these environments" (Hill & Land, 1998, p. 167). Taking active roles in the learning environments can be "a significant challenge to students who expect learning to be

transmission of knowledge" (Dochy, Segers, Bossche, & Struyven, 2005, p. 49). If students' beliefs about teaching and learning are different from their assumptions about their roles in student-centered learning environments, and if they are reluctant to change their beliefs and roles, students are likely to have negative perceptions of these learning environments.

Students' beliefs seem to be relatively static and stable because they have been formed over time, and changes in beliefs about teaching and learning, or conceptual changes, are slow to develop (Prawat, 1992). However, in this study, it is assumed that students' positive learning experiences in constructivist, student-centered approaches may promote changes in their beliefs about teaching and learning in accordance with the assumptions of student-centered learning. The findings from Howard, McGee, Schwartz, and Purcell (2000) imply that epistemology may be less stable than was previously recognized, suggesting that constructivist approaches may bring about epistemological changes. For successful implementation of student-centered learning approaches, teachers and instructional designers should help students shift their roles to being active participants. In order to facilitate students' participation in student-centered activities, practitioners and educators need to help students realize advantages of constructivist, student-centered approaches and to perceive them positively. Once students appreciate student-centered learning and have positive learning experiences, they may change their beliefs about teaching and learning to be more consistent with constructivist, student-centered approaches. For the purpose of this study, students' beliefs were assumed to interact with learning environments, affecting their perceptions of those learning environments. Furthermore, students' perceptions and their learning experiences were, in turn, likely to influence their beliefs about teaching and learning.

Given the importance of students' roles in student-centered learning environments, the mismatch of ways that students have been taught and student-centered learning approaches provides the rationale for investigating students' beliefs about teaching and learning in relation to their perceptions of the learning environments; that is, it is important to identify what beliefs about teaching and learning students bring in to their learning environments and how the beliefs are related to their perceptions of student-centered learning environments. In addition, if the beliefs that students bring regarding teaching and learning are inconsistent with the assumptions of student-centered learning, it is important to investigate whether their beliefs change through their experiences in student-centered learning environments. Therefore, this study focused primarily on students' beliefs about teaching and learning in relation to their perceptions of student-centered learning and also examined changes in their beliefs resulting from their experiences in a student-centered learning environment.

Purpose of the Study

This case study was intended to investigate students' beliefs about teaching and learning in relation to their perceptions of the *Studio Experience*, a student-centered learning environment. This study also examined whether students' beliefs and their perceptions changed through their experiences in the learning environment. Specifically, the purpose of this study was to examine (a) whether graduate students' beliefs about teaching and learning were compatible with the expectations of student-centered learning environments, (b) whether graduate students with different beliefs about teaching and learning perceived the *Studio* learning environment differently, and (c) whether students' beliefs changed through their learning experiences in the *Studio* courses.

Research Questions

The following research questions guided this study:

1. How are students' beliefs about teaching and learning compatible with the expectations of student-centered learning environments?
2. How are students' beliefs about teaching and learning related to their perceptions of the *Studio Experience*?
3. How do students' learning experiences in the *Studio* influence the change in their beliefs about teaching and learning?

Significance of the Study

Given the growing interest in designing and implementing student-centered learning environments, this study has three major implications. First of all, it is worthwhile to understand students' beliefs about teaching and learning and their learning experiences in the new constructivist learning environment. A better understanding of students' beliefs about teaching and learning will allow teachers to challenge students' beliefs by exposing them to the new approach and make students transform their beliefs accordingly. As Savin-Baden (2000) points out, however, students' voices have been missing and little is known about their learning experiences in new learning contexts from their own perspectives. Thus, this qualitative case study contributes students' perspectives and experiences to current research regarding designing and implementing student-centered learning environments.

Second, the findings of this study will inform teachers and educational practitioners that students' different beliefs about teaching and learning and their background skills and knowledge should be considered in the design and implementation of student-centered learning environments. Student-centered learning environments should be designed to guide students to

adjust themselves to novel approaches to teaching and learning and to participate in authentic problem-solving activities as they come to realize their roles in student-centered learning environments. Also, personal support and guidance tailored to students' needs are necessary if students have little background knowledge and skills. Through guided participation (Rogoff, 1990) with external support, students are likely to become full participants in these learning environments.

Finally, findings from this study provide practitioners and educators with foundations for its grounded design to optimize student-centered learning approaches (Hannafin, Hannafin, Land, & Oliver, 1997). Through successive implementations and refinements of student-centered learning environments, researchers and practitioners will be able to provide frameworks and methods that reflect a constructivist view of learning and teaching.

Chapter Summary

This study is organized into six chapters: introduction, literature review, methodology, participants' profiles, findings, and conclusions. This chapter presented the background, the statement of the problem, and purpose of this study and research questions and defined the key constructs. Also, methodology of the study was outlined and significance of the study was discussed. The following Chapter Two presents a review of literature related to student-centered learning environments and the importance of student beliefs about teaching and learning and their perceptions of learning environments. Chapter Three describes the research design and methodology of the study. Chapter Four presents each participant's profile. Chapter Five presents the major themes and their relationships regarding the students' positioning in, perceptions of, and reactions to the *Studio*. Chapter Six concludes this study with an overview of

the study and the implications for practice and for further research. The conclusions are followed by a list of references and appendices.

CHAPTER II

REVIEW OF LITERATURE

Individuals hold personal beliefs about knowledge, ways of knowing, teaching, learning, learning environments, and effective learning approaches. Although the personal beliefs are often unconscious and implicit, people are likely to be influenced by their beliefs in everyday life (Hofer, 2002). Beliefs seem to influence how people perceive, interpret, and organize new ideas, as well as how they integrate them into existing ideas. Also, beliefs have an impact on higher-order thinking, problem solving and decision making. As Nespor (1987) argued, beliefs guide individuals to define problems, seek relevant information, and solve the problems. In learning situations, beliefs influence how to approach learning, how to perform, and what to learn from experiences. Depending on the interaction between beliefs and learning contexts or new information, some beliefs may facilitate learning, whereas other beliefs may hinder learning (Clement, Brown, & Zietsman, 1989). For instance, some students may view themselves as passive recipients and believe what teachers teach to them instead of thinking critically and constructing their own knowledge. Even though many educational researchers have examined teachers' beliefs in relation to their teaching practices, little research has been conducted on students' beliefs, especially about teaching and learning, and students' perceptions of learning environments and learning experiences from their own points of view. Given the importance of beliefs in learning contexts, it is important to understand what students believe about teaching and learning, how the beliefs influence their perceptions of a student-centered learning environment, and how the beliefs evolve over time.

This study was intended to explore graduate students' beliefs about teaching and learning in relation to their perceptions of student-centered learning and changes in beliefs in a student-centered learning environment. Thus, three main areas were reviewed in this chapter: (a) teaching and learning in higher education, (b) a theoretical framework of student-centered learning environments, and (c) students' beliefs about teaching and learning. To begin with, I review research on teaching and learning in higher education. Next, I provide a theoretical framework of student-centered learning environments. Then, I present a definition of students' beliefs about teaching and learning, review research on beliefs, and provide an overview of changes in beliefs. This chapter concludes with implications for research on students' beliefs about teaching and learning in student-centered learning environments.

Teaching and Learning in Higher Education

Students in higher education bring a variety of characteristics into classrooms, such as diverse experiences, prior knowledge and skills, motivations and expectations for learning, learning styles, and beliefs about teaching and learning. Especially in graduate programs, it is assumed that students have formed relatively stable motivations to learn and expectations for learning based on their lives and previous learning experiences. Therefore, teachers and educational practitioners in higher education have an interest in understanding how they can help such diverse students and facilitate their learning. In this section, an overview of research on teaching and learning in higher education is presented, and then followed by empirical studies related to models of student learning.

Overview of Research on Teaching and Learning in Higher Education

Research into student learning in higher education has shown the relationship between approaches to learning and learning outcomes. Marton and Säljö (1976) examined qualitative

differences in the process of learning and identified two different levels of processing or approaches to learning: *surface-level* and *deep-level* processing. In the case of surface-level processing, students focus on remembering or memorizing learning materials. Thus, students tend to use rote-learning strategies. Alternatively, deep-level processing indicates that students are likely to draw the intentional content from learning materials and thus focus on what is significant in the materials. In the study of the process of student learning, Entwistle and Ramsden (1983) contrasted a deep approach with a surface approach. When reading an article, students adopting a surface approach intended to memorize the factual information, whereas students with a deep approach tended to understand the meaning of the article, focusing on authors' intentions and arguments. The differences in the learning approaches were closely related to the qualitative differences in learning outcomes. A deep approach to learning was associated with a deep level of understanding; that is, students who adopted a deep approach were able to understand the meanings of given passages instead of repeating what was written in the passages. Another approach to learning, called the *strategic* approach (Entwistle & Ramsden, 1983), has also been identified, which is associated with obtaining the highest grades.

Biggs (1979) identified three dimensions of the learning process—*utilizing*, *internalizing*, and *achieving*—that are similar to surface, deep, and strategic approaches, respectively. Based on the Structure of the Observed Learning Outcome, or SOLO, taxonomy (Biggs & Collis, 1982), which consists of five levels of judgments about given information in terms of relationship between the information and the judgments, Biggs examined the quality of student learning in relation to approaches to learning. The study results showed differences in learning outcomes, indicating that the internalizing orientation to learning was related to meaningful understanding, whereas the utilizing orientation was linked to the retention of factual information.

Because there is a clear relationship between learning approaches and learning outcomes, much attention has been paid to what factors can influence the approaches to learning. Research has shown that students' approaches are influenced by various factors, such as conceptions of learning (van Rossum & Schenk, 1984), orientations to teaching (Kember & Gow, 1994), and learning environments (Newble & Clarke, 1987). For example, in order to examine the relationship between learning environments and students' approaches to learning, Newble and Clarke compared students' approaches to learning between a traditional and an innovative medical school. While the traditional school was teacher-centered, lecture-based, focused on factual information, and reliant on quizzes and tests, the innovative medical school adopted student-centered and problem-based approaches. The big difference lay in the fact that the innovative school was more concerned with how students solved clinical problems rather than what and how much students knew. The study results indicated that students in the innovative school adopted deep approaches to learning, or meaning orientation, whereas students in the traditional school were associated with surface approaches, or reproducing orientation.

Although it had appeared that learning environments or contexts had directly influenced students' learning processes, there has been growing awareness of the role of students' perceptions. Research has shown that students' perceptions of learning environments mediate between characteristics of individual differences and variables of learning environments and influence students' approaches to studying and learning (Entwistle, 1987; Entwistle & Ramsden, 1983; Entwistle & Tait, 1990; Meyer & Muller, 1990; Ramsden, 1979); that is, students adopt different learning approaches depending on their perceptions of learning environments rather than the learning environments themselves. Because there is a strong association between students' perceptions of learning contexts and their learning approaches, it can be implied that

student learning is influenced by the interaction between individual differences and learning environments (Entwistle & Ramsden, 1983).

The 3P Model of Learning and Teaching

Students bring various different characteristics into learning situations, such as their learning experiences, prior knowledge and skills, learning styles, motivations and expectations for learning, and beliefs about teaching and learning. The interaction between students' characteristics and learning environments seems to influence students' approaches to studying and learning, which leads to qualitatively different learning outcomes. These relationships are illustrated in a model of student learning, often called the 3P model, as shown in Figure 1.

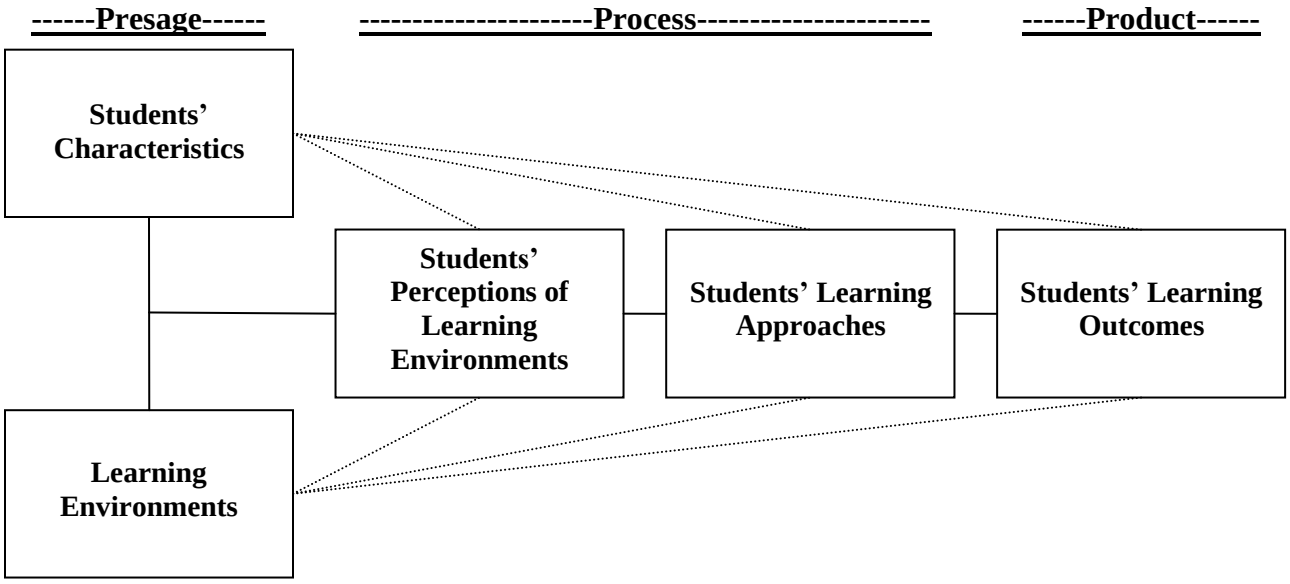


Figure 1. The 3P model of student learning (adapted from Prosser & Trigwell, 1999).

The 3P model was originated from Dunkin and Biddle (1974), who integrated findings of studies of teaching and constructed a model for the study of classroom teaching. In the model, they identified four variables for research on teaching: presage, context, process, and product

variables. Presage variables concern the characteristics of teachers, including their prior experiences, teacher-training experiences, and teacher personal beliefs. Context variables concern students, schools, communities, and classroom environments. Process variables involve actual activities of teachers and students in the classroom. Product variables refer to the outcomes of teaching.

Based on the Dunkin and Biddle's (1974) model, Biggs (1991) proposed the 3P model of student learning that comprised three main components: presage, process, and product. Presage factors include students' individual characteristics, such as learning styles, prior knowledge and skills, motivations and expectations for learning, and beliefs about teaching and learning. Learning environments are also regarded as presage factors, including such factors as teachers, peers, teaching methods, and course structures. The model's process component involves students' interpretations of learning contexts, which determine their learning approaches. Product can be measured either quantitatively or qualitatively, or both, depending on teachers' epistemological stances regarding learning environments.

Students' characteristics. Educational researchers and practitioners have paid much attention to individual differences in learning situations (Jonassen & Grabowski, 1993; Riding & Rayner, 1998). Since people think, feel, and learn in different ways, individual differences have been regarded as important factors of student learning in learning contexts (Cassidy, 2004). The individual differences include previous learning and experience, prior knowledge and skills, learning styles, motivations and expectations for learning, and beliefs about teaching and learning. The individual differences can act as a filter when students encounter new information, thus influencing the learning process. It is assumed that if the individual differences can be accommodated to learning environments, an improvement of learning and performance can be

expected. Accordingly, valuing individual differences and encouraging diverse students to actively learn becomes a key in higher education. Therefore, educational researchers have become increasingly interested in integrating individual differences into the design of learning environments (Cassidy, 2004).

Learning environments / contexts. There has been a shift of research interest in adult education from a focus on individual learners to the learning context itself (Mclntyre & Grudens-Schuck, 2004; Merriam & Caffarella, 1999). Mclntyre and Grudens-Schuck believe that the recognition of context is a hallmark of contemporary research in adult education. As such, it has been recognized in adult learning that the context where learning takes place is integrated into the learning process and has an impact on students' learning experiences (Caffarella & Merriam, 2000; Jarvis, 1987; Merriam & Caffarella, 1999).

A learning environment is a place where learning is fostered and supported. In order to help students learn in learning contexts, teachers and instructional designers carefully design and implement effective learning environments. In learning environments, a number of factors are likely to influence student learning, including epistemological grounds of learning environments, teachers and peers, teaching methods, tools, course structures, and teachers' beliefs about teaching and learning. For example, it is acknowledged that different instructional approaches influence learning differently, leading to different outcomes of learning (Gagné, Wager, Golas, & Keller, 2005); that is, learning can be influenced by changing ways of presenting knowledge and encouraging students to use appropriate learning strategies.

The classroom in higher education is full of individual learners with different backgrounds and experiences that are integrated into the learning context, influencing the learning process. Boud, Cohen, and Walker (1993) highlight that "different kinds of learning

occur depending on whether the context is perceived as positive or negative" (p. 15). Influenced by their learning contexts, adult learners are likely to position themselves differently in different learning contexts, which gives them different perspectives in interacting with others, sensing, interpreting, and transforming experiences into knowledge. Moreover, teachers' conceptions of teaching and learning have an impact on their approaches to teaching, which influences students' approaches to learning and the resulting learning outcomes (Trigwell, Prosser, & Waterhouse, 1999). For example, if teachers focus on transmission of knowledge, students are likely to adopt a surface approach to studying and learning.

Perceptions of learning environments. Student perceptions of learning environments involve recognition of characteristics of the environments and influence interpretation of learning experiences in the context. The perceptions of the learning seem to be held through their prior learning experiences and affect their approaches to learning (Prosser & Trigwell, 1999); because students have different learning experiences, they may perceive the same context differently, and thus approach learning differently. The differences in learning approaches, in turn, result in different learning outcomes.

The perceptions of learning environments are influenced by individual differences because student perceptions represent their epistemological beliefs and their beliefs about teaching and learning (Sheppard & Gilbert, 1991; Tsai, 2000). Among those, it has been recognized that student perceptions of learning environments are highly related to their epistemological beliefs (Pajares, 1992; Tsai, 2000). Tsai investigated the relationships between student scientific epistemological beliefs and student perceptions of constructivist learning environments. Through the analysis of 1176 questionnaires of Taiwanese tenth-graders (16 year olds), Tsai showed that students with constructivist-oriented epistemological beliefs tended to

perceive that actual learning environments were less constructivist than what they expected and preferred. Indeed, the constructivist-oriented students preferred interaction with others, integration of new knowledge with their existing knowledge, and open-ended learning activities.

Students' learning approaches. Three types of approaches to learning have been identified: surface, deep, and strategic approaches (Biggs, 1979; Entwistle & Ramsden, 1983; Marton & Säljö, 1976). According to Biggs, each approach has different motives and strategies. The surface approach to learning is triggered by extrinsic motivation, such as gaining incentives and obtaining jobs, whereas the deep approach is based on intrinsic motivation, such as genuine interests in or curiosity about given topics. Also, students adopting the surface approach are interested in rote learning and thus focus on memorization of factual information. However, students adopting the deep approach make learning relevant and meaningful to themselves through discussion and reflection. Meanwhile, the strategic approach is associated with achievement through competition, such as high grades.

Students' learning outcomes. Any form of teaching has the goal of student learning, which may include retention of information, improvement of performance, transfer of what is learned to other situations, and changes in views about something. The outcomes of student learning can be evaluated in terms of quantity and quality (Biggs, 1979). As Biggs noted, because of subjectivity regarding the assessment of quality of learning, student learning has often been measured in terms of quantity. Although Bloom's taxonomy (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956) was developed with the intention of assessing the quality of learning, it was actually used more to evaluate test outcomes rather than learning outcomes (Jonassen, 1997). In an effort to evaluate learning quality, Biggs and Collis (1982) developed the SOLO Taxonomy, which consisted of five levels of structural organizations: prestructural, unistructural,

multistructural, relational, and extended abstract. Gagné (1985) classified learning outcomes into five categories: verbal information, intellectual skills, cognitive strategies, attitudes, and motor skills. Verbal information, or declarative knowledge, refers to the knowledge that people can state, memorize, recall, and rephrase. Memorizing and recalling a poem is an example of verbal information. Intellectual skills, often called procedural knowledge, include the acquisition of concepts and rules, the application of rules and principles, and problem solving. Gagné distinguishes intellectual skills as *knowing how*, whereas verbal information refers to *knowing that*. Cognitive strategies refer to capabilities that people use to manage their own learning. For example, metacognition is a special kind of cognitive strategy in that metacognition monitors and controls cognitive processes in order to accomplish learning tasks. Attitudes determine people's positive or negative reactions toward a situation. Attitudes are related to motivation, which explains why people engage in some activities rather than others (Pintrich & Schunk, 2002). Motor skills require people to execute movements such as swimming or playing tennis. Gagné has emphasized that learning conditions should differ internally and externally according to the types of expected learning outcomes. For example, playing tennis can be learned by recalling prior information, acquiring information, observing an expert performance, practicing a subroutine like swinging, and increasing the combinations of the subroutines toward the goal of playing a match.

As discussed earlier, empirical evidence has indicated that learning outcomes are closely related to approaches to leaning, which are in turn influenced by students' perceptions of learning environments. Considering that students' perceptions are influenced by individual characteristics and learning contexts, the outcomes of learning need to be consistent with epistemological stances regarding learning environments and students' beliefs about teaching

and learning (Biggs, 1991). For example, outcomes from the view of learning as gaining knowledge cannot be described and evaluated similarly to those from the perspective of learning as developing as a person.

Student-Centered Learning Environments: A Theoretical Framework

There are two traditions of instructional approaches in classrooms: teacher-directed instruction and student-centered learning. According to Brandes and Ginnis (1986), student-centered learning is participatory while teacher-directed instruction is didactic. In teacher-directed instruction, because knowledge exists outside students, teaching and learning are regarded as the transmission and acquisition of knowledge. Accordingly, the main focus is on what to teach and how to organize and present knowledge to students. All teachers should do is present knowledge to students in ways that students can absorb knowledge easily and remember it longer. Thus, in this tradition, while teachers are responsible for passing information in well-structured ways, students are viewed as passive learners in that they are expected to follow teachers' directions and to recite and master what teachers present to them. Because students have been taught in those settings, they feel comfortable and, more importantly, do not have to make any changes in their beliefs and roles. On the contrary, with an emphasis on learning rather than on instruction, student-centered learning focuses on how students learn and how teachers can facilitate student learning. Because knowledge is conceived to be discovered or constructed by individual students, teachers need to create a learning environment where students can be actively engaged in the construction of knowledge, learning from and with other people and resources. In such learning environments, teachers act as guides or facilitators, providing students with guidance so that students can find relevant information and useful resources, which teachers help link to students' previous knowledge and incorporate into their

knowledge schemes. In this sense, students are viewed as active learners, taking responsibility for their own learning. That is, student-centered learning expects that students learn to learn, think critically, and reflect on their learning, while directing their learning in a relatively safe learning environment. In sum, student learning in teacher-directed instruction is limited to the classroom, while student-centered learning broadens the learning context by bringing everyday practice into the classroom.

Foundations, Assumptions and Principles of Student-Centered Learning Environments

The term *student-centered learning* in this study refers to instructional approaches consistent with the constructivist perspective of learning: knowledge is constructed by people rather than transferred to them. Accordingly, a student-centered learning environment is a place where students can construct knowledge while solving authentic problems in social contexts. In this sense, problem-based learning, constructivist learning environments, and open-ended learning environments are some examples falling under the umbrella of student-centered learning.

Based on constructivism, student-centered epistemologies are different from those in teacher-directed instruction (Jonassen & Rohrer-Murphy, 1999; Land & Hannafin, 2000). Because knowledge is constructed by students through experiences in authentic contexts, student-centered learning requires students' active involvement in learning. From the perspectives of constructivism, Savery and Duffy (1995) identified three central principles of learning and understanding: (1) understanding as a product of interactions with the environment, (2) cognitive conflict as stimulus for learning, and (3) evolution of knowledge through social negotiation. In 1997, the American Psychological Association's (APA) Board of Educational Affairs (1997) used research on teaching and learning to revise and expand a set of learner-centered psychological principles related to the learner and the learning process for the design

and implementations of more learner-centered approaches. The principles assume that learning is active and reflective, and thus emphasize that learners should be active in their learning contexts.

Cuban (1990) characterized student-centered leaning approaches as "cooperative learning, greater student participation in classroom tasks, and increased teacher and student use of computers" (p. 3). Although, by nature of constructivism, differences exist among various forms of student-centered learning environments, there are five key principles and assumptions upon which instructional designers and teachers can design and implement student-centered learning environments: (1) students as active constructors of meanings, (2) knowledge constructed from experiences in authentic contexts, (3) scaffolding of learners, (4) increased use of technology, and (5) multiple perspectives through collaborative learning. Among these principles, student construction of knowledge is the main focus of student-centered learning, while the others support knowledge construction, as shown in Figure 2.

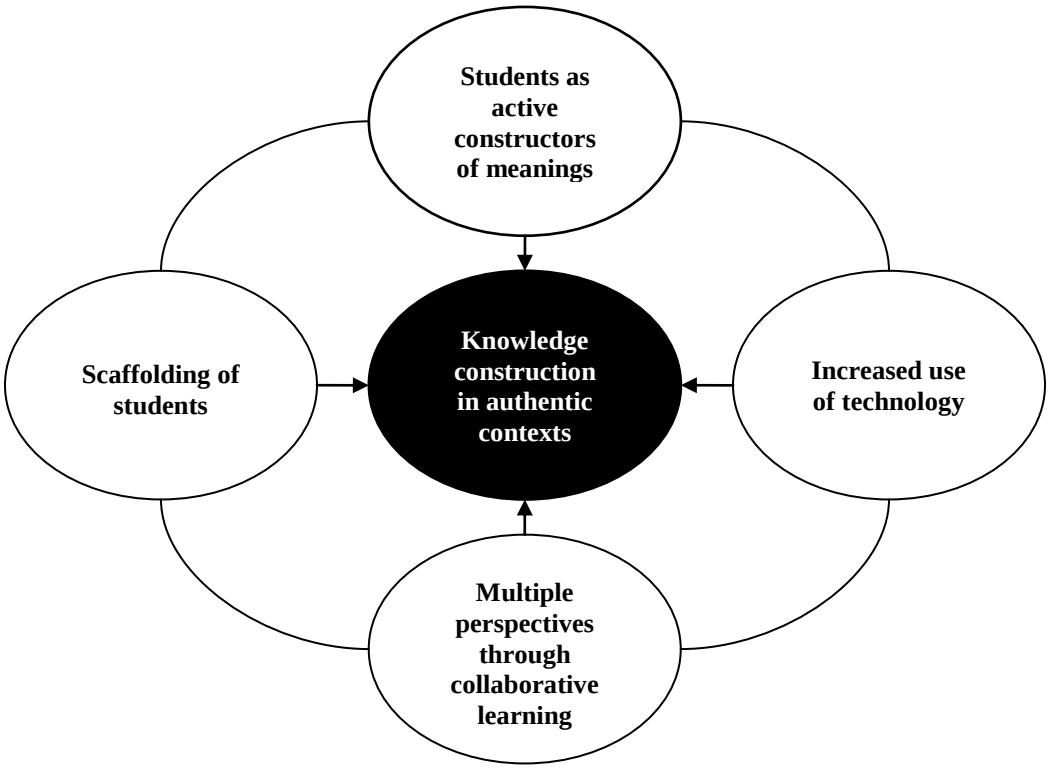


Figure 2. Key principles and assumptions of student-centered learning environments.

Students as active constructors of meanings. Student-centered learning begins with acknowledging individual differences (McCombs & Whisler, 1997). Students, especially those in higher education, bring a great amount of diverse experiences to classrooms with them, and the different backgrounds become rich resources for learning. The differences in previous experiences, levels of prior knowledge and skills, beliefs about learning and teaching, self-regulated skills, and attitudes toward learning are related to students' learning styles, expectations for learning, perceptions of learning environments, and strategies or approaches to problem solving (Land & Hannafin, 1996). Individual differences are also closely related to motivation to learn (APA Work Group of the Board of Educational Affairs, 1997) and influence the interpretation of new experiences and the construction of knowledge; thus, individual differences have a critical impact on the learning process and learning outcomes. Student-

centered learning environments are supposed to appreciate and accommodate the differences in the learning process.

The importance of individual differences in previous experiences has been discussed in adult education (Boud, et al., 1993; Knowles, Holton, & Swanson, 1998; Kolb, 1984; Merriam & Caffarella, 1999). Knowles and his colleagues recognized the significance of the experiences that learners bring to the classroom in their andragogical model. Introduced by Knowles (1970), andragogy was defined as "the art and science of helping adults learn" (p. 38) and has been recognized as "a theory of adult education, theory of adult learning, theory of technology of adult learning, method of adult education, technique of adult education, and a set of assumptions" (Davenport & Davenport, 1985, p. 157). Knowles argues that adult learners are independent and self-directed so that they can take responsibility for themselves, their lives, and their learning. Self-directed learning involves being primarily "responsible and in control of what, where, and how one learns" (Caffarella, 1993, p. 32) and thus has been regarded as a fundamental aspect of adult learners. Adults are regarded as active learners and they are expected to take responsibilities for their learning.

According to APA's (1997) principles, students should be active, goal-directed, and self-regulated learners, and should take responsibility for their own learning in student-centered learning environments. They also have control of their learning, which motivates them to learn more; in this sense, self-direction and self-regulation become more important in student-centered learning. In the classroom, students learn by actively using knowledge and skills in a similar or identical way to their professional practice. Students in higher education are ready and motivated to learn when they have a need to learn in order to perform a task or to solve a

problem in their everyday lives. Thus, it is critical to create learning experiences through which learners can acquire knowledge and skills as they need them.

Knowledge constructed from experiences in authentic contexts. Constructivism views learning as a process for constructing knowledge. Thus, learning is cumulative in nature, meaning that new information should be related to existing knowledge in some way so that learners can expand or modify their knowledge schemata accordingly. Learners make their meanings and deepen understandings, linking new information to their prior experiences. Through the prior experiences, they see and interpret new experiences. In this sense, experience has been regarded as the foundation of learning.

Constructivism has also emphasized the role of contexts in learning for the construction of knowledge (Duffy & Jonassen, 1992). Learning contexts include teachers, peers, culture, technology, and instructional activities, and people's thinking and actions have their own meanings depending on a particular situation (Bierema, 2001). Furthermore, the context is not isolated from the people (Rogoff, 1990); rather, people interact with the context and make sense of what happens around them. For this reason, traditional, direct instruction has been criticized for its decontextualized, simple learning activities, and students in school settings often find themselves ill-prepared to solve real problems in practice. Wilson (1993) argues that "the decontexutalized study of problem solving in laboratories does not provide evidence for verifying the assumption of transferability, nor does it provide insight into how people think in the real world" (p. 73). In other words, there is an explicit difference between the teacher-directed classroom environment and the workplace environment. The inadequacy of the problem-solving method taught in the classroom results in inert knowledge that cannot be activated in relevant problem-solving contexts.

Being interested in the application of knowledge, students in higher education are more problem-centered than subject-centered in learning. Knowles et al. (1998) wrote that "adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations" (p. 67). Because adults prefer a problem-based approach and they learn better when a problem is presented in real-life contexts, experiential learning has been rooted in adult learning practice (Knowles, et al., 1998). Thus, authentic, real-life problems or tasks should be presented in authentic contexts to maximize their learning fidelity. The closer to the real world they are, the more meaningful and relevant the learning is for students. Furthermore, students are likely to apply what they learn in classrooms to other contexts.

Jarvis (1987) maintains that learning is intimately related to the world and affected by the social context. In adult learning, educators have been challenged to create a learning experience from which adult learners are empowered in their everyday lives. Bannan-Ritland (2001), for example, incorporates action learning principles with project-based approaches to teaching instructional design. Action learning is an action-oriented process through which students learn with and from others, working on a real problem within a group (McGill & Beaty, 1995). Action learning approaches involve realistic, complex problems situated in real, meaningful contexts. In this model, action or implementation of ideas and suggestions, questioning, and reflection are valued as the core components (McGill & Beaty, 1995). While working on unfamiliar problems with diverse team members, students are asked to analyze both problems and their own actions more deeply by questioning and reflecting upon their experiences (Bannan-Ritland, 2001). Bannan-Ritland notes that the action learning model has "the potential to increase the complexity

of teaching in the service of providing an enhanced learning environment for students in dealing with complex problems" (p. 41) in instructional design.

Student-centered learning is operationalized mainly in problem-based or case-based approaches. In student-centered learning environments, authentic problems and cases from situated contexts are key elements of linking school learning and real-life performance (Herrington & Oliver, 2000). It has been acknowledged that students learn better when they are engaged in problem solving situated in everyday practice (J. S. Brown, et al., 1989). Brown et al. argue that because knowledge is situated in nature and developed as a product of the social interaction with activity, context, and culture, what is learned cannot be separated from how it is learned and used. Rather, "learning and acting are interestingly indistinct, learning being a continuous, life-long process resulting from acting in situations" (J. S. Brown, et al., 1989, p. 33). According to Brown et al., learning is a process of enculturation in that through authentic learning activities, students become members of the community and understand the culture of the practice. That is, learning is a way to appropriately use knowledge as professionals. Therefore, authentic activity through cognitive apprenticeship is a key to accessing the culture of practice in the community. Through modeling, coaching, scaffolding, articulation, reflection, and exploration, students learn how experts solve complex problems within their social contexts (Collins, Brown, & Newman, 1989).

Furthermore, student-centered learning is open-ended in that learning processes and outcomes vary depending on students in learning contexts (Glasgow, 1997). Since authentic problems can be viewed from multiple perspectives and thus solved in different ways, students have more freedom to explore problems and generate a solution in their own ways. That is, when students are presented with problems, it is the students who determine how to solve them,

and what and how to learn from the problem-solving activities. The nature of open-endedness in learning contexts makes learning accommodated to the diverse characteristics and needs of students.

Scaffolding of learners. Learning has becomes practical and pragmatic in higher education (Caffarella, 1993). Instead of transferring knowledge to students through lectures and demonstrations, teachers guide students to expert performance through interaction with the social environment (Collins, et al., 1989). Student-centered learning provides authentic problems to students so that they can develop their expertise while working with them. However, providing authentic learning experiences does not ensure meaningful and effective learning. Due to the nature of ill-structured authentic problems and the complexity of practice, students may have difficulty solving authentic problems and learning from problem-solving practices situated in real life (Ge, Chen, & Davis, 2005; Land, 2000; van Merriënboer, Kirschner, & Kester, 2003); that is, even though authentic problems have great potential for learning, they may in fact hamper learning if used without proper scaffolding. Oliver and Hannafin (2001), for example, found that students had difficulty finding specific problems and generated only partial solutions in open-ended, problem-based learning environments. Land and Hannafin (1997) examined patterns of understanding in an open-ended learning environment and found that students tended to perceive and interpret information incorrectly, thus failing to recognize the limitations of their existing understanding and to refine the understandings to encompass new information. Moreover, students often fail to engage in meaningful problem-solving activities and knowledge construction in student-centered learning environments (Land, 2000). Therefore, there is a strong need to scaffold or support students' learning (Ge, et al., 2005; Land, 2000; van Merriënboer, et al., 2003). Teachers should provide students with appropriate scaffolding and

supports to maximize their potential and develop their independence in problem-solving processes. That is, teachers need to provide scaffolding for students to grow and become more competent in their communities of practice.

Scaffolding refers to the support and guidance given to push students' actual developmental levels toward higher levels of development. Scaffolding, as an instructional support, can be characterized as indirect guidance and fading (van Merriënboer, et al., 2003). Scaffolding does not explicitly direct students; rather, it provides the guidance toward the completion of a learning task. Also, scaffolding is faded at some point, meaning that it is gradually reduced until students can perform the task independently. Roehler and Cantlon (1997) described scaffolding as a balance of support and challenge in the *zone of proximal development* (ZPD). The ZPD describes the whole process of learning and can be understood as the distance between actual development level and potential level of development that is possible with support and guidance (Vygotsky, 1978). In order to measure the distance and provide appropriate scaffolding and feedback, it is critical to continuously assess students' current status of knowledge and skills. Thus, alternative assessment approaches aligned with constructivist perspectives of teaching and learning should be considered (Reeves & Okey, 1996). While traditional teacher-directed assessment has been associated with tests and examinations to verify student learning or retention of factual knowledge, alternative assessment, such as portfolio assessment, self- and peer-assessment, and performance assessment, should be considered essential to the learning process (APA Work Group of the Board of Educational Affairs, 1997).

Student-centered learning requires teachers to transition from playing the role of information giver to playing the role of facilitator. As Brookfield (1986) noted, teachers become resources for learning, supporting student learning. Galbraith (2004) explains that "the purpose

of teaching is to facilitate personal growth and development that impact the professional, social, and political aspects of learners" (p. 3). It is essential for teachers to provide a learning environment where students have access to relevant resources and appropriate support for problem solving. With external guidance and support, learners become competent, develop their expertise in their performance, and move, empowered, toward the center of the community of practice.

Increased use of technology. As technology has advanced, the use of computers in instructional settings has rapidly increased because of the easy accessibility of computers, their perceived cost-effectiveness, and their interactive and multimedia capabilities (Reiser, 2001). Gagné et al. (2005) noticed that recent developments in computers and related technology have changed what, how, where, and when students learn. For example, students can learn anywhere anytime in online learning environments, which can be used to supplement face-to-face instruction, in a blended mode with face-to-face instruction, and in Web-based instruction without any face-to-face instruction (Mishra, 2002). Online learning environments can also provide such advantages as flexibility in time and place and easy access to learning materials (Bonk, 2002). As such, emerging technologies make it possible for us to think about new learning environments where students can benefit from the affordances that technologies can offer.

Learning with technology can enhance the learner's cognitive processing (Jonassen, 1992; Salomon, Perkins, & Globerson, 1991). In this sense, technologies for instructional purposes can be considered cognitive tools (Jonassen, 1992; Jonassen & Reeves, 1996). According to Jonassen and Reeves, cognitive tools are "technologies, tangible or intangible, that enhance the cognitive powers of human beings during thinking, problem solving, and learning" (p. 693).

Distinguished from mere media as instructional delivery methods, cognitive tools are intellectual complements to cognitive processing that support learning and performance, empowering students to think critically and thus to construct knowledge (Jonassen & Reeves, 1996; Salomon, et al., 1991). The uses of computer programming languages such as BASIC and LOGO, hypermedia and multimedia, semantic networking, expert systems, databases, and spreadsheets as cognitive tools are well documented (see Jonassen & Reeves, 1996). For example, Jonassen (2003) describes how cognitive tools can be used to externalize the learner's internal representation of problems to be solved. When representing problems, students are engaged in cognitive processes, which are likely to lead to the construction of knowledge.

Cognitive tools are intellectual, cognitive partners (Salomon, et al., 1991). They support deep cognitive processes of learning so that people can organize, elaborate, reconstruct, and represent knowledge; that is, deep cognitive processes involve active processing of relevant preexisting knowledge, linking it to new information, and making new information conditionalized so that people can retrieve and use the information when it is relevant. Also, cognitive tools facilitate communications between participants in learning communities so that people can share knowledge, and they lead to the construction of knowledge through the shared space. Because cognitive tools are learner-centered, they are best used in constructivist learning environments (Jonassen & Reeves, 1996). Moreover, cognitive tools help people reflect on their experience (Jonassen & Reeves, 1996). Reflective thinking is necessary for meaningful learning because it helps people to understand their experiences and construct knowledge from them.

The development and the availability of advanced technologies in classrooms have influenced the emergence of technology-enhanced, student-centered learning environments. Incorporated with emerging technologies, student-centered learning holds great potential for

representing the complexities of practice to students (Bransford, et al., 1999; Jacobson & Archodidou, 2000; Merseth & Lacey, 1993). Hannafin and Land (1997) argue that technology-enhanced, student-centered learning environments can provide learning experiences that are authentically situated, support cognitive processes that deepen the understanding of abstract concepts, and thereby promote the construction of knowledge.

Technology-enhanced, student-centered learning environments can present multiple representations of a problem, and students can access information for analysis through a variety of media, including text, graphic, audio, video, and simulations (Merseth & Lacey, 1993). In these learning environments, students can explore multiple facets of a problem and understand the complexity of the situation in practice. Bransford et al. (1986) argue that developments in technology make it possible to create "semantically rich contexts for problem solving and discovery" (p. 12), while traditional approaches have been criticized as being isolated from contexts. Also, students can have infinite access to information in technology-enhanced learning environments, so that they learn how to search, assess, and integrate information relevant to the problem situations in order to solve problems (Merseth & Lacey, 1993). Moreover, technology-enhanced learning environments can present problems in a way that students can understand them easily (Williams, 1992).

Multiple perspectives through collaborative learning. Constructivists have agreed that knowledge is constructed through social interactions with others and the surrounding environments and that is evolved through social negotiation from multiple perspectives. For example, cognitive flexibility (Spiro & Jehng, 1990), the ability to flexibly adapt and use knowledge within various contexts, increases through multiple explanations, multiple examples, and multiple perspectives on problems and cases. Spiro and Jehng assert that the goal of

learning has shifted from knowledge reproduction to knowledge use or application, particularly in ill-structured domains. Rather than focusing on the acquisition of knowledge in a linear pattern, knowledge should be taught in authentic problems, and knowledge application is fostered through multiple representations of "concepts-in-practice" (Spiro & Jehng, 1990, p. 199).

Student-centered learning environments emphasize collaboration among students in that collaborative learning provides students with opportunities to work in groups and support each other to achieve shared goals, while students discuss and explore multiple perspectives and negotiate meanings (Land & Hannafin, 2000). Technology-enhanced, student-centered learning environments can provide students with contextualized problems, which students can share with teachers and peers and explore together, enhancing multiple interpretations and understandings from diverse perspectives (Bransford, et al., 1986; Merseth & Lacey, 1993). Shared problem solving in the context of shared learning is a key to learning in apprenticeship (Rogoff, 1990). For example, Fitzgerald, Wilson, and Semrau (1997) have designed an interactive multimedia program called *Perspectives on Emotional and Behavioral Disorders*, which is based on cognitive flexibility theory, to provide realistic scenarios for enhancing the problem-solving skills of teachers working with children who have emotional and behavioral disorders. In this program, teachers can observe children in various situations, interview their teachers and parents, access information such as complex, multiple theories, listen to experts' reasoning on the cases, and engage in problem-solving activities. Fitzgerald et al. found that there were significant changes in their understanding of children from multiple perspectives and that students appreciated the usefulness of collaborative work in helping children.

Student-Centered Learning Environments in Practice

Student-centered learning is mostly operationalized in the forms of problem-based, project-based, or case-based learning. Instead of memorizing isolated facts without application, students explore, discuss, and solve problems in such learning environments. While doing so, they deepen their understandings and construct knowledge via authentic problem-solving activities. It is likely that they may remember their problem-solving experiences and use them to generate solutions to new problems that they will encounter in real-life practice. Anchored instruction (Bransford, et al., 1990; CTGV, 1990), for instance, is presented as a way to create a learning environment where students can acquire knowledge through problem solving in anchored or situated contexts. While exploring the contexts from multiple perspectives and observing how experts use their knowledge to solve problems, students are also likely to know the conditions under which the knowledge is useful and can be applied; that is, students come to perceive the knowledge as a tool for problem solving. Based on anchored instruction, the *Jasper Series* (CTGV, 1992) presents a series of video-based, narrative adventures. This technology-based program is designed to promote mathematical thinking and problem solving. After watching each story, students in pairs have to generate a problem to be solved and then solve the problem using relevant information presented in the story. Moreover, teachers are encouraged to have students solve analog and extension problems so that students can develop flexible knowledge representations and spontaneous transfer (CTGV, 1990).

Cognitive apprenticeship (Collins, et al., 1989) is another instructional approach that includes observation, coaching, and successive approximation rather than direct and didactic teaching. In cognitive apprenticeship, students are guided toward expert performance through interaction with social environments. This method includes realistic, complex problems situated

in real and meaningful contexts. The authentic problems make learning relevant and meaningful to students, as students are encouraged to actively participate in analyzing the problem and discussing and generating possible solutions like professionals. While modeling enables novice students to observe the processes that experts use to solve complex problems, coaching helps students think like professionals with external support. Reflection is used for students to formulate an internal model of expertise, and articulation requires students to make what they are thinking and doing explicit so that other members of the class can benefit from it. Finally, students take full responsibility for their learning and performance through exploration. Based on the cognitive apprenticeship (Collins, et al., 1989), Ertmer and Cennamo (1995) designed an introductory instructional design to help students develop and refine their performance. They incorporated situated learning, modeling, coaching, reflection, articulation, and exploration into the course to provide students with opportunities to practice real design tasks. In this model, meaningful problem-solving contexts were created so that students could identify and solve authentic problems. According to Ertmer and Cennamo, students showed the acquisition of a deep understanding of the design process and the appreciation of multiple perspectives, and it was likely that students would transfer their knowledge and skills to novel situations.

Given the fact that reflection is considered a characteristic of the professional (Schön, 1987), Shambaugh and Magliaro (2001) used a reflexive instructional approach to teach a master's level instructional design course. They incorporated authentic instructional design tasks, modeling of design expertise, reflective activities, and peer feedback into their course. Students discussed the instructional design processes, including learning beliefs, design tools, needs assessment, instructional sequence, assessment, instructional frameworks and media, prototype lessons, and program evaluation. The reflexive model was designed to provide opportunities for

students to use the instructional design processes to think and make decisions for developing instructional interventions to promote learning and to examine students' beliefs about learning and teaching. The model was reflexive in that the instructor and students examined their own roles in the learning environment; that is, the teacher examined his or her learning and teaching, while students scrutinized their performance as learners. In this reflexive model, teachers and students were considered co-participants and co-learners. The course was structured for the members to participate in the classroom community through classroom activities, learning tasks, and texts. Within the structure of the course, feedback between participants was centered so that students could reflect on their learning compared to others in order to promote understanding of the instructional design processes and their learning beliefs.

Research on Learning in Student-Centered Learning Environments

Despite the recent efforts of numerous research studies, questions regarding the effects of student-centered approaches on learning outcomes still remain (Berkson, 1993). In a meta-analysis of 43 articles regarding the effects of problem-based learning (PBL), Dochy, Segers, Van den Bossche, and Gijbels (2003) showed a consistent positive effect on the skills of students. Norman and Schmidt (1992) also reviewed empirical evidence of the impact of PBL on student learning and concluded that even though there was no evidence of improvement of problem-solving skills, PBL increased retention and transfer of knowledge, intrinsic motivation in subject matter, and self-directed learning skills. According to Schuh (2003), students seemed to use their prior knowledge and link it to new experiences in more learner-centered environments. However, Kirschner, Sweller, and Clark (2006) called constructivist, discovery, problem-based, experiential, and inquiry-based teaching minimally guided instruction and criticized them for being less effective and less efficient than direct instructional guidance. In a comparative study

with traditional teaching methods, Tynjälä (1999) examined the effect of a constructivist learning environment on learning outcomes. She found that even though students in the constructivist learning environment emphasized knowledge application, the development of critical thinking, and conceptual changes, there was no difference between a constructivist and a traditional learning environment in terms of types of conceptual change. Colliver (2000) also concluded that there was no convincing evidence of the impact of PBL on knowledge acquisition and clinical performance based on a literature review of the effectiveness of PBL.

While there has been continuing controversy related to learning outcomes of constructivist approaches to teaching and learning, proponents of PBL believe that PBL increases student motivation and helps students to develop self-directed learning skills. Albanese and Mitchell (1993) conducted a meta-analysis of research studies on learning outcomes of PBL compared with those of conventional instruction. The study revealed that PBL was more nurturing and enjoyable and that teachers tended to enjoy teaching in PBL environments. Vernon and Blake (1993) found that PBL enhanced students' clinical performance and students reported higher level of satisfaction with PBL, although there was no difference in the test scores in factual and clinical knowledge between students in PBL and in traditional methods. Furthermore, students tend to perceive PBL positively, which leads to higher levels of satisfaction. Kaufman and Mann (1996) compared students' perceptions of their courses in PBL environments with students' perceptions in conventional curricula. The students in PBL environments recognized the advantages of PBL, including higher-level thinking, better management of information, and development of self-directed learning, whereas the students in conventional classes rated higher on the learning of details than did those in the PBL classes. Fiddler and Knoll (1995) reported a high level of student satisfaction and application of

knowledge and skills in PBL environments. In a study of students' self-regulation in a case-based learning (CBL) environment, Ertmer, Newby, and MacDougall (1996) found that students with high levels of self-regulation valued and benefited from the CBL, whereas students with low levels of self-regulation were inconsistent in their value on the case method of instruction and their confidence in learning from cases.

However, little attention has been paid to students' experiences, challenges, and perspectives in constructivist, student-centered learning environments (Perkins, 1992). Students in higher education are concerned by a lack of structure, guidance and support in constructivist, student-centered learning environments (Lea, Stephenson, & Troy, 2003). Lack of adequate guidance for learning in student-centered learning can result in student disorientation and frustration (Brush & Saye, 2000). As mentioned earlier, there are individual differences, including knowledge, skills, learning styles, motivations to learn, learning attitudes, and beliefs, that can influence learning and performance in learning situations. Among those, the pre-existing beliefs may influence their views and interpretations of student-centered learning. Because of their unfamiliarity with student-centered learning approaches, students may feel that they are not prepared to be active and to take responsibility for their learning, and thus resist the transition of their roles. Also, students may regard student-centered approaches as requiring more work on their parts (Weimer, 2002). Furthermore, due to the open nature of student-centered approaches, it takes time for students to explore problems and generate solutions for them (Hung, Bailey, & Jonassen, 2003). Therefore, although students are likely to be motivated to learn and to deepen their understandings, very limited content can be covered in a limited time.

Students' Beliefs about Teaching and Learning

Recently, there has been a growing interest in the role of beliefs in various learning environments. People, for example, hold their beliefs about the nature of knowledge and ways of knowing, and research has shown that epistemological beliefs are related to learning in many ways (Duell & Schommer-Aikins, 2001; Hofer, 2001; Ryan, 1984). Epistemological beliefs, also called epistemic cognition, personal epistemology, or personal theories, have both direct and indirect effects on learning (Schommer, 1994). Studies about epistemological beliefs have shown that individual beliefs about knowledge and knowing influence learning processes, learning strategies, self-regulated learning, motivation, and learning outcomes (Cano, 2005; Hofer, 2001; Hofer & Pintrich, 1997; Ryan, 1984; Schommer, Crouse, & Rhodes, 1992). Therefore, with the increasing interest in student-centered learning, it is critical to examine what beliefs students bring into the classroom and whether the changes in beliefs occur in order to support and improve student learning.

However, as Pajares (1992) pointed out, although beliefs have been regarded as an important topic to educational researchers, the term *belief* has not been clearly defined. Because meanings of *belief* are broad enough to be used in many different ways, including teacher efficacy, epistemological beliefs, and self-efficacy, there has not yet been a consensus about what is meant by the word (Pajares, 1992; Pedersen & Liu, 2003; Schommer, 1994). For example, *belief* has been used synonymously with other terms, such as attitude, opinion, perception, conception, personal theory, and perspective (Pedersen & Liu, 2003). In some cases, the word *belief* has been used very narrowly, focusing on specific academic content, including beliefs about teaching math and science (Kagan, 1992). In other cases, *belief* is used interchangeably with *knowledge* (Kagan, 1990). Pajares suggests that beliefs should be clearly

defined and articulated before conducting research to generate meaningful findings and implications. Because of the broad nature of the construct of beliefs, Pajares suggests that the phrase *beliefs about* should be required, such as beliefs about knowledge and ways of knowing (epistemological beliefs), beliefs about teachers' confidence to help students learn (teacher efficacy), beliefs about self-confidence to perform courses of actions (self-efficacy), beliefs about teaching, beliefs about learning, beliefs about learning environments, and beliefs about specific subjects. Therefore, in this section, I define *beliefs about teaching and learning* for the purpose of this study and review research studies regarding these beliefs in educational contexts. Then, I conclude this section by looking at changes in these beliefs.

Defining Students' Beliefs about Teaching and Learning

The term *students' beliefs about teaching and learning* here is broadly defined as students' implicit assumptions and understandings about teaching, learning, and learning environments. Since beliefs about teaching and learning are strongly related, they should be understood together instead of being isolated from each other (Prosser, Trigwell, & Taylor, 1994). The beliefs are tied to the expectations of and attitudes toward teaching and learning that students bring into the classroom with them and drive their actions (Fang, 1996). From the perspectives of students, the beliefs include meanings or understandings of teaching and learning, the expectations of what teaching and learning should be, and the roles of teachers and students (Chan & Elliott, 2004). Thus, beliefs about teaching and learning are manifested in the preferences of learning environments. Indeed, beliefs have affective and emotional components (Nespor, 1987), and these components are related to how students perceive learning environments.

It should be noted that, for the purpose of this study, the word *belief* is used synonymously with the term *conception* (Kember, 1997; Patrick & Pintrich, 2001). Like *belief*, *conception* has been used for different levels, from conceptions of learning and conceptions of knowledge to conceptions of mathematics and conceptions of gravity. In this study, the terms *belief* and *conception* are used to indicate a broader sense. It is assumed that the more broadly the terms are used, the more difficult changes in *beliefs* seem to occur. For example, even though students have incorrect conceptions of gravity, they are likely to correct their conceptions of gravity after obtaining the right information. However, it seems to be difficult to change the conception of learning because it has been formed over time and is considered to be stable. Pratt (1992) described *conceptions* as follows:

> Conceptions are specific meanings attached to phenomena which then mediate our response to situations involving those phenomena. We form conceptions of virtually every aspect of our perceived world, and in so doing, use those abstract representations to delimit something from, and relate it to, other aspects of our world. In effect, we view the world through the lenses of our conceptions, interpreting and acting in accordance with our understanding of the world. (p. 204)

The description of conception above implies that beliefs influence people's interactions with their environments. Bransford et al. (1999) note that people's constructions of understanding begin with their beliefs, knowledge, and experiences, implying that their beliefs influence the interpretation of their learning environments and experiences. For instance, if students hold more student-centered conceptions of teaching and learning, they may feel constrained and frustrated when they are sitting and taking enormous amount of notes without any applications of the information. According to Pajares (1992), beliefs function as "a filter through which new

phenomena are interpreted" (p. 325). Furthermore, Pajares notes that "beliefs are the best indicators of the decisions individuals make throughout their lives" (p. 307) and that when they encounter novel problems, people tend to depend on their beliefs to define the problems and to make decisions in order to deal with them.

Students' beliefs about teaching and learning are based on their prior learning experiences. Furthermore, beliefs about teaching and learning appear to be related to epistemological beliefs. Chan and Elliott (2004) examined the relationship between epistemological beliefs and conceptions of teaching and learning. They found that innate/fixed ability, authority/expert knowledge, and certain knowledge are related to traditional conceptions of teaching and learning, whereas learning effort/process was associated with constructivist conceptions. Kember (2001) posited that "students have a consistent cluster of beliefs about the nature of knowledge, a conception of learning and a belief about how teaching should take place" (p. 205). Tsai (2002) referred to the cluster of beliefs as nested epistemologies. According to Pajares (1992), "It is important to think in terms of connections among beliefs instead of in terms of beliefs of independent subsystems" (p. 327). However, Schommer (1994) conceptualized personal epistemology as "a system of more or less independent beliefs" (p. 27). By using the system of beliefs, she proposed five epistemological dimensions to consider in personal epistemology: stability of knowledge, structure of knowledge, source of knowledge, speed of knowledge acquisition, and control of knowledge acquisition. In order to test the proposed dimensions, Schommer (1990) developed a questionnaire and administered it to 260 undergraduate students. Factor analysis of the questionnaires identified four epistemological dimensions: (a) fixed ability, (b) simple knowledge, (c) certain knowledge, and (d) quick learning. For example, beliefs of quick learning view persistent efforts as a waste of time that

leads to oversimplified conclusions, while beliefs of certain knowledge avoid ambiguity and seek absolute conclusions. By more or less independent, Schommer (1994) meant that beliefs within the system did not seem to be developed at the same time, which explains how people often have conflicting beliefs. Indeed, Schommer (2004) proposed an embedded systemic model of epistemological beliefs, showing the interaction among cultural relational views, beliefs about ways of knowing, beliefs about knowledge, beliefs about learning, classroom performance, and self-regulated learning. Therefore, taken together, students' beliefs about teaching and learning are understood as a part of students' general belief systems and they are loosely tied to other beliefs within the system.

Beliefs about teaching. Since the early 1990s, there have been efforts to identify teachers' beliefs about teaching and to organize them in order to examine their impacts on teaching practice and student learning. Fox (1983) proposed four basic theories of teaching: transfer, shaping, traveling, and growing theories. The transfer theory implies that knowledge can be transferred from teachers to students, which is associated with lectures and demonstrations. Teachers using the shaping theory intend to shape students to target patterns of behaviors not only by lecturing, but also by showing and demonstrating appropriate behaviors. Teachers utilizing traveling theory play a role as an expert guide and support students' explorations so that students can have better perspectives. Finally, the growing theory focuses on the intellectual and emotional development of students.

Samuelowicz and Bain (1992) interviewed thirteen teachers in higher education to examine their conceptions of teaching. They identified five qualitatively different classifications of conceptions of teaching, from teaching as imparting information to teaching as supporting student learning. Based on a larger sample of 39 teachers from a broad range of disciplines,

Samuelowicz and Bain (2001) modified and extended their earlier framework to seven orientations to teaching and learning. These detailed orientations can be grouped into two broader groups: teaching-centered and learning-centered. For example, the notion of teaching as imparting information is aligned with teacher-directed instruction, where teachers have control of contents and teaching can be seen as the transmission of knowledge from teachers to students. Teaching as supporting student learning is consistent with a student-centered approach to teaching, where students take responsibility and play more active roles in their learning. This view of teaching posits that good teaching involves supporting students' learning by encouraging students to develop their interests, helping students regulate their learning, monitoring students' progress, and giving feedback on student works.

Pratt (1992) identified five different conceptions of teaching based on the interviews of 253 adults. These five conceptions are engineering, apprenticeship, developmental, nurturing, and social reform. First, the engineering conception regards teaching as delivering content or transmitting information, and thus focuses on the teacher and the content. This conception of teaching is related to a teacher-centered approach in learning contexts. Second, the apprenticeship conception views a teacher as a model or expert who can show students best practices of what is learned. Third, the developmental conception focuses on students' cognitive development through changing their understanding and thinking. This view seems to be more learner-centered because of the emphasis on students' knowledge construction and teachers' facilitation of student learning. Fourth, the nurturing conception focuses on students' self-concepts, which help students grow as a whole person in society. Finally, the social reform conception looks at teaching as a way to seek a better society.

Reviewing and synthesizing 13 research studies on conceptions of teaching, Kember (1997) identified five conceptions of teaching: imparting information, transmitting structured knowledge, teacher-student interaction, facilitating understanding, and conceptual change. He then grouped these conceptions into two broader categories: teacher-centered/content-oriented and student-centered/learning-oriented conceptions. The teacher-centered, content-oriented conception focuses on the presentation of information. From this viewpoint, a student is considered passive and the goal of instruction is to deliver knowledge to the student. The student-centered, learning-oriented conception moves towards facilitation of student learning and aims at conceptual change and intellectual development. In this conception, students are expected to take more active roles. There is also a transitional conception of teaching, which Kember labeled as student-teacher interaction. This transitional belief focuses on the interaction between students and teachers, in which teachers become models or experts and students learn how to perform like the teachers. Similarly, Gow and Kember (1993) found two general conceptions of teaching—knowledge transmission and learning facilitation. Since conceptions of teaching and beliefs are closely related, it can be integrated into a continuum, with teacher-centered transmission of knowledge at one end and student-centered learning facilitation at the other end, as shown in Table 1.

Table 1. *Beliefs about Teaching and Learning*

Study	Classifications					
Beliefs about teaching						
Boulton-Lewis et al. (2001)	Transmission of content/skills	Development of skills/understanding	Facilitation of understanding	Transformation		
Dunkin & Precians (1992)	Structuring	Motivation	Independence	Social		
Fox (1983)	Transfer	Shaping	Traveling	Growing		
Dunkin (1990)	Structuring learning	Motivating learning	Encouraging activities and independence in learning	Establishing interpersonal relations conducive to learning		
Pratt (1992)	Engineering	Apprenticeship	Developmental	Nurturing	Social reform	
Prosser et al. (1994)	Transmitting Concepts of the Syllabus	Transmitting the Teachers' Knowledge	Helping Student Acquire Concepts of the Syllabus	Helping Students Acquire Teacher Knowledge	Helping Students Develop Conceptions	Helping Students Change Conceptions
Samuelowicz and Bail (1992)	Imparting information	Transmitting knowledge	Facilitating understanding	Changing students' conceptions	Supporting student learning	
Samuelowicz and Bail (2001)	Imparting information	Transmitting structured knowledge	Providing and facilitating understanding	Helping students develop expertise	Preventing misunderstandings	Negotiating understanding	Encouraging knowledge creating
Trigwell, Prosser, & Waterhouse (1994)	Transmission of information (teacher-focused)	Acquisition of concepts (teacher-focused)	Acquisition of concepts (teacher/student interaction)	Conceptual development (student-focused)	Conceptual change (student-focused)	
	Teacher-centered ⟷ **Student-centered**					
	Content-oriented ⟷ **Learning-oriented**					
Beliefs about learning						
Boulton-Lewis et al. (2001)	Acquisition and reproduction of content/skills	Development and application of skills/understanding	Development of understanding	Transformation		
Marton, Dall'alba, & Beaty (1993)	Increasing knowledge	Memorizing and reproducing	Applying	Understanding	Changing perspectives	Changing as a person
Prosser et al. (1994)	Accumulating More Information to Satisfy External Demands	Acquiring Concepts to Satisfy External Demands	Acquiring Concepts to Satisfy Internal Demands	Conceptual Development to Satisfy Internal Demands	Conceptual Change to Satisfy Internal Demands	
Säljö (cited in van Rossum & Schenk, 1984)	Increase in knowledge	Memorization	Acquisition of fact, procedures, skills, etc.	Abstraction of meanings	Interpretation of reality	
van Rossum, Deijkers, & Hamer (1985)	Increase of knowledge	Memorizing	Application of knowledge	Gaining insights and understandings	Personal development	

Beliefs about learning. Learning has traditionally been associated with a behavioral framework. From the behavioral perspective, learning concerned behavioral changes that resulted from external factors. For example, student learning was believed to be enhanced by providing reinforcement and punishment. During the 1960s, cognitive conceptions of learning focused on the acquisition of knowledge and were concerned with mental process and knowledge structure (Shuell, 1986). According to Shuell, cognitive conceptions of learning changed the view of learning to active, constructive process and considered learners to be active constructors of meaning.

Säljö (cited in van Rossum & Schenk, 1984) interviewed people about their understanding of learning and identified five different learning conceptions: (a) learning as an increase in knowledge, (b) learning as memorization, (c) learning as acquisition of facts, procedures, skills, and methods, (d) learning as the abstraction of meaning, and (e) learning as interpretation of reality. The first three conceptions of learning can be grouped together as a reproductive view of learning, whereas the last two conceptions share a constructivist view of learning (van Rossum, et al., 1985). Using Säljö's conceptions of learning, Marton, Dall'alba, and Beaty (1993) conducted a research study in which they asked students about their views of learning. After six years of the study, they identified six different conceptions of learning: (a) learning as gaining knowledge, (b) learning as memorizing, (c) learning as applying, (d) learning as understanding, (e) learning as changing perspectives, and (f) learning as developing as a person. Prosser et al. (1994) also interviewed 24 teachers in higher education and identified five different conceptions of learning in terms of their structural and referential components: acquisition of information for external demands, acquisition of concepts for external demands,

acquisition of concepts for internal demands, conceptual development for internal demands, and conceptual change for internal demands.

These different learning conceptions seem to strongly influence students' interpretations of educational concepts, such as meanings of good teaching, understanding, and application of knowledge (van Rossum, et al., 1985). For example, students who hold a conception of learning as the increase of knowledge tend to depend on teachers and to memorize everything for passing tests. They are likely to value the teachers who deliver knowledge and skills in ways that allow for easy mastery. On the contrary, students with a constructive view of learning are self-directed and use teachers and peers as resources for their learning. Rather than memorizing everything, they review new knowledge and information critically and integrate them into their existing knowledge schemes.

Research on Beliefs in Educational Contexts

Although there has been recognition of the importance of beliefs in learning environments, much focus has also been placed on teachers' beliefs and their implications for teaching practice. Indeed, teachers' beliefs have long been an important area of educational research. It has been acknowledged that teacher beliefs play an important role in teachers' classroom practices (Fang, 1996; Kagan, 1992) and in educational innovation and reform (Trigwell, et al., 1994; van Driel, Bulte, & Verloop, 2007; van Driel, Verloop, Inge van Werven, & Dekkers, 1997). Therefore, this section begins with an overview of research on teachers' beliefs, which is followed by a summary of research on students' beliefs in educational contexts.

Teachers' beliefs. Teachers have been regarded as one of the most important components in classrooms. Like students in higher education who have diverse backgrounds and experiences, teachers bring a variety of different experiences to their classrooms. In educational or training

settings, teachers plan, conduct, and evaluate instructional activities, materials, strategies, and methods for optimizing students' learning experiences. When teachers are involved in the practice of education, they make a number of important instructional decisions, from what to teach to how to implement and evaluate instruction. The decisions they make certainly reflect on their personal philosophies, beliefs, and values about teaching and learning (Conti, 2004; Elias & Merriam, 1995; Palmer, 1998; Zinn, 2004). Because they have different backgrounds and experiences, they have their own educational philosophies. The differences in educational philosophies influence their decisions in the practice of education. These educational philosophies, beliefs, and values are embodied in the form of teaching styles (Kagan, 1992; Zinn, 2004). In other words, teaching styles are intimately related to the teachers' educational philosophies, showing overall characteristics, beliefs, attitudes, traits, and qualities of teachers (Conti, 2004).

Research into teachers' beliefs includes exploring the congruence between conceptions of teaching and conceptions of learning held by teachers (Boulton-Lewis, et al., 2001), the relationships between teachers' general beliefs about teaching and learning and their domain-specific beliefs (van Driel, et al., 2007), the relationship between teachers' beliefs and their teaching practices (Richardson, Anders, Tidwell, & Lloyd, 1991), and the effects of preservice courses on student teachers' thinking about teaching (Bramald, Hardman, & Leat, 1995). For example, there have been a number of research studies examining teachers' beliefs about teaching in relation to their impact on the practice of teaching (Nespor, 1987), which leads to influence on students' learning outcomes (Gow & Kember, 1993; Trigwell, et al., 1999). Gow and Kember examined teachers' views of teaching and learning and how they relate to student learning. Using interviews and questionnaires, they identified two conceptions of teaching:

learning facilitation and knowledge transmission. Teachers with the learning facilitation orientation helped students to develop problem-solving skills and critical thinking, whereas teachers with the conception of knowledge transmission focused on content. Gow and Kember found that student learning approaches were also influenced by teachers' conceptions of teaching. While the conception of knowledge transmission is likely to lead students to adopt a surface approach to study, the view of learning facilitation encourages students to have deep approaches. Moreover, teachers' beliefs influence their decision making and problem solving in teaching practice (Munby, 1982; Nespor, 1987). For example, as Nespor noted, teachers depend on their beliefs to define tasks and problems and organize information related to their work in the ill-defined, complex context of teaching.

Teachers' beliefs about effective teaching have a significant impact on their implementation of student-centered learning (Pedersen & Liu, 2003). Pedersen and Liu conducted a case study of 15 teachers and examined their beliefs about issues in the implementation of *Alien Rescue*, a computer-based program designed to create a student-centered learning environment. Pedersen and Liu found that teachers' beliefs would be critical for teachers to implement student-centered learning programs in ways that they were designed. Prawat (1992) argued that since student-centered approaches to teaching and learning are often inconsistent with teachers' current beliefs about teaching and learning, the adoption of the new approach should entail major changes in teachers' roles in learning environments.

Students' beliefs. It has been acknowledged that individual students have different beliefs about teaching and learning. Students, especially in higher education, hold their beliefs about teaching and learning throughout their learning experience and bring those beliefs into learning contexts. These beliefs influence learning in many ways, including learning approaches,

motivations to learn, and attitudes toward learning (Duell & Schommer-Aikins, 2001; Hofer, 2001; Paulsen & Feldman, 1999; Ryan, 1984). Since students have different previous learning experiences, they have different beliefs about teaching and learning. For example, some may view learning as acquisition of knowledge presented by teachers, while others may see learning as construction of knowledge based on their previous knowledge and the resources around them.

Just as teachers' beliefs about teaching and learning influence their teaching practices (Pajares, 1992; Prawat, 1992), students' beliefs about teaching and learning are related to their motivation to learn, their approaches to learning, and their learning outcomes (Kember, 1997; van Rossum & Schenk, 1984). In an analysis of a questionnaire administered to approximately 300 students, Crawford, Gordon, Nicholas, and Prosser (1994) identified a relationship between students' conception of mathematics and their approaches to learning mathematics. According to Crawford and her colleagues, students' conceptions of mathematics and their approaches to learning mathematics influence each other dynamically; that is, students' conceptions are influenced by their learning approaches, and the conceptions affect their approaches to learning mathematics.

Kember (2001) characterized beliefs about knowledge and the process of teaching and learning into two orientations: didactic/reproductive and facilitative/transformative orientations. Students with the didactic/reproductive belief set consider teaching to be a process of transmitting knowledge, where learning is viewed as a process to absorbing knowledge. Students with the facilitative/transformative belief set believe that knowledge is transformed or constructed by students themselves. Thus, teaching is a process of facilitating learning and students are responsible for constructing knowledge. Based on interviews with 53 novice and experienced students, Kember found that students' beliefs about knowledge and the process of

teaching and learning influence their attitudes and abilities to adjust themselves to higher education environments. For example, novice students holding didactic, reproductive beliefs had difficulty adjusting to student-centered learning environments. Therefore, the epistemological gap between teacher-directed learning and student-centered learning may require a conceptual change in students' beliefs about teaching and learning.

Change in Beliefs in Higher Education

Mezirow (1991) defines learning as "the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation, and action" (p. 1). Mezirow (1978) regards transformation as a structural change in the way new experiences are mediated, interpreted, and assimilated to previous experiences. That is, transformational learning is concerned with how people look at themselves and the world (Merriam & Caffarella, 1999). The process of transformative learning is closely related to one's experiences (Merriam & Caffarella, 1999). Mezirow (1978) explains that life changes, such as a change of residence, graduation from college, or a sudden job loss, may lead to transformation in meaning perspective. The meaning perspective refers to a lens through which people view the world, interpret what happens, and construct knowledge from experiences. Similarly, when students are placed in new learning environments, they may change their views on teaching and learning.

Perry (1970) was interested in how college students interpreted their learning experiences and how their interpretations evolved over time. Thus, he investigated the intellectual and ethical development of Harvard undergraduate students during their four years at the college. Based on interviews of the college students about their college experiences, Perry proposed a developmental scheme consisting of nine hierarchically arranged stages or positions. The nine

positions can be grouped into three parts: dualism, relativism, and commitments in relativism. He concluded that college students developed their views of knowledge and values in their college years, from absolute truths to generalized relativism to more individualized beliefs and values related to their lives.

The development of student epistemology is influenced by many factors, including student learning approaches, perceptions of learning environments, teachers' beliefs about teaching, and teaching methods (Sheppard & Gilbert, 1991). Based on a six-year longitudinal study of 10 students in Open University, Morgan and Beaty (1997) investigated changes in conception of learning over time. By comparing the answers in early interviews with those in later interviews, they identified a development of the view of learning in Säljö's (cited in van Rossum & Schenk, 1984) framework; indeed, students changed their views of learning from memorization and addition of knowledge to understanding and relating to real personal lives. In a longitudinal study, Schommer and her colleagues (Schommer, 1993; Schommer, Calvert, Gariglietti, & Bajaj, 1997) investigated the development of epistemological beliefs among secondary students related to learning and found that students modified and developed their epistemological beliefs and that these beliefs influenced academic performance.

Changes in beliefs, or conceptual changes, can be explained by assimilation and accommodation. In *assimilation*, people use existing conceptions to deal with new information. However, if the current conceptions are not adequate to deal with new information, they should be replaced and restructured by new conceptions that are different from the existing conceptions. These conceptual changes are called *accommodation*. Posner, Strike, Hewson, and Gertzog (1982) proposed a general model of conceptual change in science. The model described four conditions under which conceptual changes could occur: dissatisfaction, intelligibility,

plausibility, and fruitfulness. First, conceptual changes begin by *dissatisfaction* with current conceptions. If current conceptions can deal with new ideas and information, there is no need for individuals to change the existing conceptions. The conflicts between current and new conceptions seem to be a starting point for conceptual changes. The second condition is that individuals should understand a new, alternative conception (*intelligibility*). The third condition is that, based on the understanding, individuals should be able to apply the new conception (*plausibility*). Finally, the individual must see benefits from the new conception, such as better understanding of ideas, information, and experiences (*fruitfulness*). Furthermore, in addition to the conditions above, motivational and contextual factors may influence the process of conceptual change (Pintrich, Marx, & Boyle, 1993).

Although it is not clear whether the conditions for conceptual change can also trigger changes in beliefs about teaching and learning, these four conditions give some insights to explain changes in beliefs (Bendixen, 2002; Patrick & Pintrich, 2001). If students believe that their roles should be active and are comfortable in student-centered learning environments, they do not need a change in their beliefs. However, if students' beliefs about teaching are tied to formal lectures and quizzes, their beliefs are challenged by the assumptions and expectations of student-centered learning. Dissatisfied with their current beliefs, students seek alternative views of teaching and learning and become aware of key ideas and expectations of student-centered learning. Based on their understandings of ideas and expectations, students must have opportunities to apply their understandings so that they will be able to know that the ideas and expectations are plausible. Then, after having better learning outcomes and positive learning experiences, students are likely to change their beliefs about teaching and learning in accordance with student-centered learning. Moreover, if students are motivated to achieve their goals and if

support and encouragement of classroom learning communities are provided, the process of conceptual change may be accelerated.

Patrick and Pintrich (2001) discussed a few key common features of conceptual change among various models. First, most of the conceptual models agree that student conceptions influence thinking and learning. Second, the influences of conceptions seem to be implicit in that students may not know their own conceptions or their influences on thinking and learning. Third, students are intuitive in that they tend to depend on their conceptions in everyday life. Fourth, student conceptions can often impede learning when the conceptions are naïve and inappropriate. Fifth, because of the nature of the conceptions being intuitive, it is difficult to change the conception through instruction. Thus, conceptual changes may be difficult and take time. Even though conceptions are changed, the new conceptions seem to be tentative (Patrick & Pintrich, 2001). Patrick and Pintrich focused on conceptions of learning, motivation, and instruction and discussed whether there was a developmental trend among preservice teachers entering teacher education, preservice teachers during their teaching education programs, and novice teachers with a few years of teaching experiences. They found that many teachers in teacher education programs changed their views of teaching to more constructivist perspectives. However, after teaching in practice for a few years, teachers appeared to change their beliefs back to the initial beliefs of teaching as transmission of knowledge. As such, changes in beliefs are not an easy process. Just as teachers' beliefs are relatively stable and resistant to change (Kagan, 1992; Pratt, 1992), students, especially those in higher education, have formed beliefs about teaching and learning throughout their experiences, and their beliefs do not seem to change rapidly (Nespor, 1987). The interaction among beliefs, perceptions, and experiences may not only impede a change in beliefs, but may also reinforce the existing beliefs (Pajares, 1992).

Indeed, teachers and educational practitioners are often resistant to change and like to hold their own beliefs and thinking that are inconsistent with the student-centered perspective (McCombs & Whisler, 1997). Likewise, students may not change their beliefs and roles from teacher-dependent to independent learners.

Some research, however, indicate that people can change their beliefs, and, in turn, their actions in classrooms, through their experiences. Classroom experiences can not only shape personal beliefs about teaching and learning, but also have an impact on changes in these beliefs. In a six-year longitudinal study, Cady, Meier, and Lubinski (2006) examined the beliefs and practice of twelve preservice teachers in collaborative learning environments that were created to help them transition from preservice to experienced teachers. The study results revealed that not only the participants' epistemological beliefs, but also their beliefs about teaching and learning, had changed. The participants indicated that experiences, increased pedagogical knowledge, time, and supportive environments influenced the changes. Another study was conducted by Bernstein, Tipping, Bercovitz, and Skinner (1995), in which they examined changes in students' attitudes after the implementation of PBL. The results revealed that there was a significant change in students' perceptions toward PBL as being a more effective instructional method than traditional teaching methods. In his research on change in epistemological beliefs of about 1,600 secondary students, Cano (2005) also concluded that students changed their epistemological beliefs as they progressed through their studies.

Implications for Research on Students' Beliefs about Teaching and Learning

The importance of student perceptions of learning environments has been acknowledged in relation to students' approaches to learning and the quality of their learning outcomes (Entwistle, 1987; Entwistle & Tait, 1990; Fraser & Fisher, 1982; Lizzio, Wilson, & Simons,

2002). According to Entwistle, learning environments themselves do not have direct effects on student learning; rather, students' perceptions of learning environments influence students' approaches to learning. The relationship between learning environments and students' approaches to learning is mediated by their perceptions of learning environments (Entwistle, 1987). Fraser and Rentoul (1980) recognized that students felt comfortable and performed better in their preferred learning environments. That is, there is a close relationship among student perceptions of learning contexts, their approaches to learning, and their learning outcomes.

Although it is still questionable how to design and implement student-centered learning that is consistent with the constructivist perspective, student-centered learning has been considered desirable in higher education, and research on teaching and learning in higher education has shown a transition of students' conceptions of teaching from being teacher-focused and content-oriented to being student-focused and learning-oriented (Entwistle & Walker, 2002). Students in higher education find formal lectures to be boring and prefer more interaction and group-based activities in the classroom (Sander, Stevenson, King, & Coates, 2000). Kinchin (2004), for example, examined students' preferences of their roles as learners in learning environments and found that most of them preferred a constructivist learning environment over an objective environment. Students expect constructivist learning environments to be more interesting and more effective and to give them ownership of their learning. As McCombs and Whisler (1997) noted, a student-centered perspective has great potential to increase student learning, and thus teachers and educational practitioners should provide learning contexts where individual learners can enhance their learning. A student-centered perspective focuses on individual learners in the learning context; that is, the perspective concerns individual differences, such as learning styles, abilities, aptitudes, interests, and needs.

Given the epistemological differences between teacher-directed instruction and student-centered learning, beliefs about teaching and learning must be taken into account when teachers want to design and implement student-centered learning environments. Hung, Bailey, and Jonassen (2003) conducted a literature review of empirical research on PBL and explored five concerns of professors who wanted to implement PBL in their classes: deep understanding of limited content, effectiveness of factual knowledge acquisition, learning outcomes, students' attitudes, and roles of professors. Among those, given the importance of students' active roles in student-centered learning environments, their initial frustrations and discomforts should be considered. Because of their learning experiences in traditional teacher-directed instruction, students have difficulty adjusting their learning styles and taking a more active role in their learning. However, once they get used to the new role, students tend to be more satisfied with the learning processes and learning outcomes in PBL environments than with traditional instructional methods.

Shifts from teacher-directed instruction to student-centered learning require changes in beliefs and assumptions about teaching and learning (McCombs & Whisler, 1997). The beliefs about teaching and learning as transmission and acquisition of knowledge may be one of the main obstacles for students in student-centered learning environments. For instance, students with more teacher-directed conceptions of teaching and learning consider teaching to be a transfer of knowledge and expect a series of well-structured lectures. When they are taught in student-centered approaches, they may find themselves uncomfortable and confused about what to learn and how to learn in such environments. Furthermore, if their existing beliefs are not challenged, they may not benefit from the new, innovative approaches to teaching and learning.

After realizing the problems related to their current beliefs about teaching and learning, students may change their views to be more consistent with student-centered learning. According to Brown and Palincsar (1989), "conceptual understanding and adaptive change are presumed to be fostered in situations that encourage dissatisfaction with the existing state of knowledge" (p. 395). Thus, it is essential to challenge students' existing beliefs for conceptual changes. Because the constructivist perspectives of teaching and learning are reflected in new and innovative educational interventions, expecting students to take more active roles toward their learning, students may feel dissatisfied with their existing beliefs, which are challenged by student-centered perspectives of teaching and learning. If students understand and benefit from the new approaches, they may change their beliefs about teaching and learning accordingly (Borko, Mayfield, Marion, Flexer, & Cumbo, 1997). As Jehng, Johnson, and Anderson (1993) suggested that beliefs are "a product of the activity, the culture, and the context in which they are cultivated" (p. 23), new constructivist, student-centered learning environments may influence changes in students' beliefs about teaching and learning.

Student-centered learning shifts an emphasis from instruction to construction. Due to the new but uncomfortable approaches to teaching and learning, students' beliefs are in conflict with the constructivist view, and thus student resistance may occur in student-centered learning. That is, there is a tension between students' beliefs formed through their learning experiences and assumptions and expectations of student-centered learning. It is essential to examine this tension and how it resolves in student-centered learning contexts. However, there is little empirical evidence about how student themselves perceive student-centered learning or how students' beliefs about teaching and learning evolve over time. Therefore, as shown in Figure 3, it is important to recognize what students believe about teaching and learning and to understand how

students perceive student-centered learning from their perspectives. Furthermore, it is critical to understand how students' beliefs about teaching and learning evolve over time.

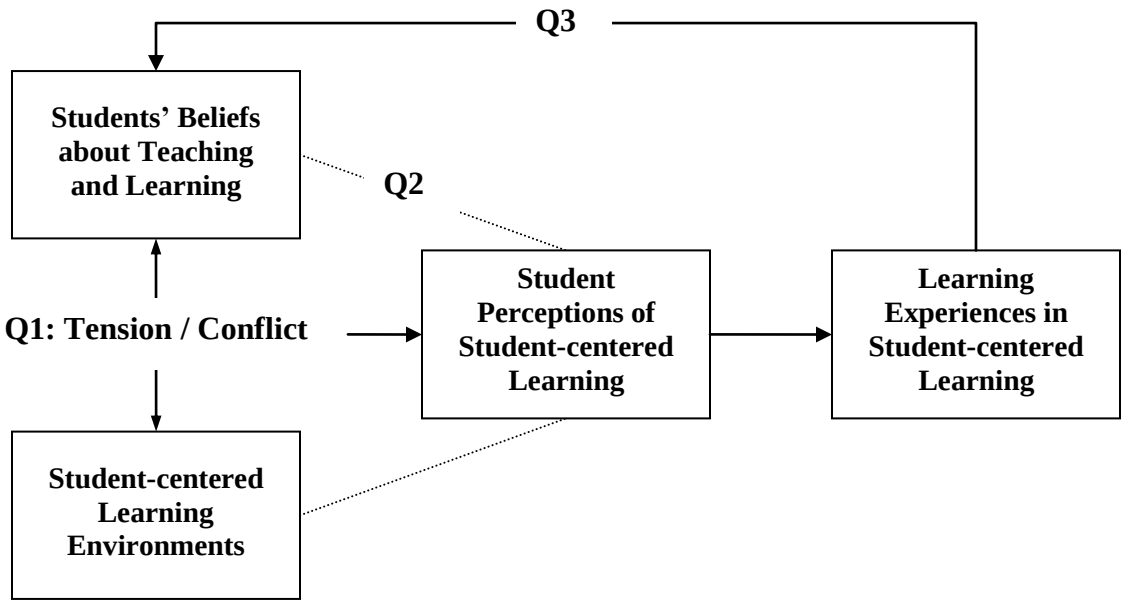


Figure 3. Framework of research on students' beliefs about teaching and learning.

Chapter Summary

This chapter began with a review of literature related to teaching and learning in higher education. A theoretical framework of student-centered learning environments was presented, which was based on construction of knowledge from experiences in authentic contexts. This chapter also provided a definition of students' beliefs about teaching and learning and reviewed research on the beliefs and their changes over time. The literature review presented in this chapter provided implications for research on students' beliefs about teaching and learning in student-centered learning environments.

CHAPTER III

METHODOLOGY

The purpose of this case study was to explore students' beliefs about teaching and learning in relation to their perceptions of the *Studio Experience* (Rieber, 2000), which was designed to be a student-centered learning environment. This study also examined whether students' beliefs and their perceptions would change through their experiences in the *Studio* learning environment. The following research questions guided this study:

1. How are students' beliefs about teaching and learning compatible with the expectations of student-centered learning environments?
2. How are students' beliefs about teaching and learning related to their perceptions of the *Studio Experience*?
3. How do students' learning experiences in the *Studio* influence the change in their beliefs about teaching and learning?

This chapter describes the research methods used for this study. The first section outlines an overview of the research design and presents results of a pilot study. The second section presents the research context, participant selection, and data collection and analysis procedures for this study are discussed. The final section highlights issues of validity, reliability, and subjectivity as well as ethical considerations of the study.

Overview of Research Design

According to Pajares (1992), "Beliefs cannot be directly observed or measured but must be inferred from what people say, intend, and do" (p. 314). Therefore, a qualitative research

study was designed and implemented to address the research questions above because of its ability to provide the necessary details about a phenomenon (Strauss & Corbin, 1998). Qualitative research focuses on participants' perspectives and their meanings and understandings related to phenomena (Bogdan & Biklen, 1982; Creswell, 1998; Merriam, 1998). Merriam characterizes qualitative research as "the goal of eliciting understanding and meaning, the researcher as primary instrument of data collection and analysis, the use of fieldwork, an inductive orientation to analysis, and findings that are richly descriptive" (p. 11). Strauss and Corbin acknowledged that qualitative methods are suitable for studies intended (a) to understand the experiences of people, (b) to explore areas to gain novel understandings, and (c) to obtain rich and detailed information about phenomena that is difficult to access through more conventional quantitative research methods.

A qualitative case study was selected because this study was designed to explore the rich and detailed learning experiences in the *Studio* courses and to better understand students' beliefs about teaching and learning and their perceptions of a student-centered learning environment. Through qualitative data collection methods, such as in-depth qualitative interviews with students, students' reflection journals, and classroom observations, students' beliefs about teaching and learning and their perceptions of the learning environment were inferred.

Pilot Study

A pilot study was conducted in the introductory *Studio* course during the summer semester of 2007. Among 17 students enrolled in the course, I selected five research participants by using Schommer's Epistemological Questionnaire (Schommer, 1998) and a student survey in order to maximize variation in terms of epistemological beliefs and prior experiences among the students in the beginning course of the *Studio Experience*. The main data collection method was

two interviews with the participants; one interview was conducted at the beginning of the course, while the other was conducted at the end of the semester.

Analysis of data showed that the participants were most accustomed to teacher-directed instruction; hence, most of them felt uncomfortable at the beginning of the *Studio* course. However, most participants agreed that they were motivated and engaged in individual projects they had chosen, and thus, felt that they were able to learn more in the course than they anticipated. Finally, through positive learning experiences in the *Studio* course, the participants recognized and appreciated the values of the student-centered approach.

Although the pilot study found that students did have positive learning experiences in the course, there were limitations of the selected research methods for addressing the research questions. Particularly, the four-week summer semester was too short to examine changes in students' beliefs about teaching and learning. Because four out of five participants were inservice teachers, for this study, I recruited participants with different backgrounds to ensure the inclusion of more diverse voices. Figure 4 shows the limitations of the pilot study and the resultant modifications for this study.

	Limitations of the pilot study	Modifications for this study
Participant selection	Because of the nature of the summer course, most participants were inservice teachers who were pursuing their master's degrees. Therefore, the pilot study did not capture students' voices and perspectives appropriately.	Based on the student survey, I recruited participants with different characteristics, such as varying age, gender, and teaching experiences.
Examination of changes in students' beliefs	The summer course was too short to look at changes in students' beliefs about teaching and learning. In addition, it was difficult to expect that students would change their beliefs after experiencing a student-centered approach over a short period of time.	Because the *Studio Experience* consisted of three courses, I selected five participants from the beginning course and the other six participants from the intermediate and the advanced courses to look at different patterns among participants in different courses.

Figure 4. Limitations of the pilot study.

Research Setting

Research Site Selection

This research study was conducted in the *Studio* courses offered in the spring semester of 2008 in the program of Instructional Design and Development (IDD) at a major university in the Southeastern United States. The main reason I chose the *Studio* courses was because they were designed to exemplify a constructivist, student-centered approach to teaching and learning. The *Studio* courses focused on students' learning in authentic contexts. Students were expected to be active constructors of meaning while the teachers provided scaffolding for students' knowledge construction. Web-based technologies provided resources for students' learning and were also used to increase interaction among peers. Furthermore, since students in the master's program were required to take at least three courses in the *Studio*, it seemed reasonable to expect changes in students' beliefs about teaching and learning and in their perceptions of student-centered learning environments. According to Rieber (2000), the unique approaches to teaching and learning and the structure of the *Studio* courses may cause students to feel uncomfortable in the *Studio Experience*, and it may take time for students to get used to the environment. Students may have different beliefs about teaching and learning, and they may not be prepared to play the active role expected in the constructivist *Studio* courses. Therefore, this study of the *Studio Experience* addressed the problem of the mismatch between students' beliefs about teaching and learning and their expectations of their roles in the courses, as well as how this mismatch influences their perceptions of the learning environment. Furthermore, because the *Studio Experience* consists of three core courses in the IDD program, there were students at different stages of the *Studio Experience*, from novice to more experienced students. Therefore, the

Studio courses allowed me to look at different patterns of students' beliefs about teaching and learning and their perceptions of the course as they relate to the degree of their *Studio* experience.

Overview of the Studio Experience

The *Studio Experience* consists of three courses: beginning, intermediate, and advanced as shown in Figure 5. *Design and Development Tools*, the beginning course of the *Studio Experience*, is designed to help students learn multimedia tools for the design and development of learning environments and to help students become familiar with the constructivist, student-centered learning environment. Instead of developing instructional projects given to them, students in the beginning course can decide what tools they want to master and what they want to produce for their independent projects, which is likely to increase their motivation to learn the tools that they choose. While working on their individual projects, students are required to write reflection journals, in which they relate what they read from the literature regarding instructional design and development to their own learning experiences. Students in the intermediate course, *Learning Environments Design I*, work individually on an instructional project in which they should satisfy instructional criteria given to them. The learning environment of the advanced course of the *Studio Experience*, *Learning Environments Design II*, becomes closer to the real world that instructional designers face. The advanced course involves realistic, complex problems or projects situated in real, meaningful contexts, and students in the course should work in a team to develop an instructional product. The authentic learning experiences make learning relevant and meaningful to students.

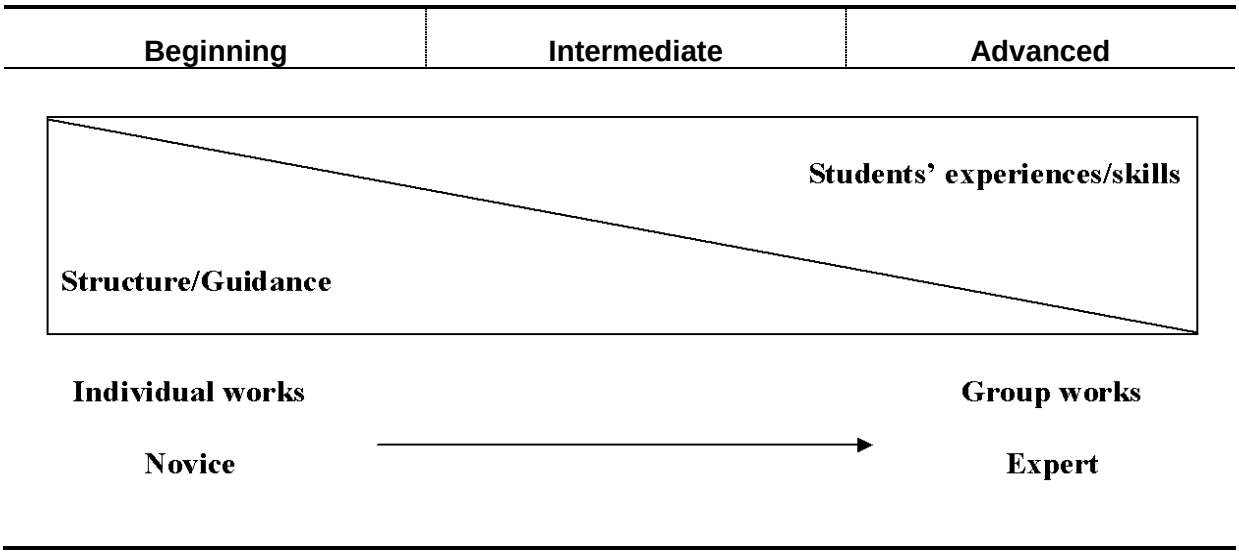


Figure 5. The structure of the *Studio Experience* (modified from Rieber, Orey, & King, 2007).

According to Bandura (1986), learning occurs either in an enactive way or in a vicarious way. Enactive learning involves actually performing a task, whereas observational or vicarious learning refers to learning through the observation of models. The *Studio Experience* includes both enactive and vicarious aspects of learning in that students learn multimedia design and development tools by observing experienced students work, as well as by designing and developing individual projects by themselves and instructional projects as part of a team. Students in the beginning course, for example, should attend at least two project team meetings of the advanced course to observe how experienced students in the *Studio* perform their projects. Also, students in the intermediate course need to participate in one of the project teams of the advanced course so that they can prepare themselves for the next level of the *Studio Experience* by working with more experienced students. Furthermore, students are encouraged to provide constructive critiques of others' projects so that they can learn from each other and improve each others' projects. While helping each other, observing others, and sharing feedback, students in different stages of the *Studio* form a learning community.

Participants

Participants in this study were selected purposefully to maximize variation in terms of epistemological beliefs, majors, ages, and prior experiences in the *Studio* courses. Purposeful sampling was used to select information-rich participants through which in-depth understanding of students' beliefs, perceptions, and experiences could be achieved (Patton, 2002). According to Patton, of the various purposeful sampling strategies, maximum variation sampling can generate "high-quality, detailed descriptions of each case" (p. 235) and identify important patterns across cases.

Instruments for Participant Selection

Schommer's Epistemological Questionnaire (Schommer, 1998) was used in order to assess students' beliefs about the nature of knowledge and ways of knowing. The questionnaire consists of 63 items that are categorized into 12 subsets: (a) seek single answers, (b) avoid integration, (c) avoid ambiguity, (d) knowledge is certain, (e) depend on authority, (f) don't criticize authority, (g) ability to learn is innate, (h) can't learn how to learn, (i) success is unrelated to hard work, (j) learn the first time, (k) learning is quick, and (l) concentrated effort is a waste of time. Through a factor analysis of the 12 subsets of items, Schommer (1990, 1993, 1998) has identified four epistemological factors, which are fixed ability, simple knowledge, quick learning, and certain knowledge. Higher scores of each factor indicate naïve views of knowledge and learning. Students in the *Studio* courses were asked to respond to each item on a Likert-type scale, from 1 (strongly disagree) to 5 (strongly agree). Additionally, in order to select a sample of participants of great diversity, I collected student information, including their contact information, age, gender, major, and earned credit hours both in their program of study and in the *Studio* courses.

Participant Selection Criteria

First, since this study aimed at understanding students' beliefs and their perceptions of the *Studio*, I decided not to include international students in order to make this study feasible and manageable. International students may bring different cultural backgrounds and different levels of English proficiency, which could influence their learning experiences and reactions to the *Studio*. Exploring international students' learning experiences in student-centered learning environments in relation to their beliefs about teaching and learning is a possible area for future research. Second, to ensure the diversity of the sample in terms of their beliefs, I selected participants who had relatively strong beliefs in one or two dimensions of Schommer's (1990, 1993, 1998) four epistemological factors. Susan, for example, was selected because her scores in quick learning and certain knowledge were relatively high. Additionally, age and teaching experiences were considered in the process of participant selection. Third, to examine different patterns of students' beliefs and their perceptions among students in different stages of the *Studio Experience*, I selected participants from different courses: five participants from the beginning, two from the intermediate, and four from the advanced courses. By selecting participants from different stages of the *Studio*, I was able to look at different patterns among the three courses based on participants' earned credits in the *Studio* courses (between-groups), as well as at changes at the individual level based on students' beliefs about teaching and learning (within-groups) throughout the semester. Finally, since the advanced course of the *Studio* focused on group projects, the project manager from each group was selected. The project managers were expected to provide rich, detailed information about their experiences in the *Studio*.

Participant Selection and Profiles

There were a total of 32 students enrolled in the *Studio* in the spring of 2008: 12 students in the beginning course, 10 in the intermediate course, and 10 in the advanced course. Of these students, 26 completed Schommer's Epistemological Questionnaire (Schommer, 1998) and the student survey (see Appendix A) on the first day of the courses. Since I did not target international students, the questionnaires from 18 American students were selected based on the student survey and used for further analysis. The average scores of students' epistemological beliefs were $M = 2.07$ ($SD = 0.36$) for fixed ability, $M = 2.53$ ($SD = 0.30$) for simple knowledge, $M = 1.92$ ($SD = 0.33$) for quick learning, and $M = 2.26$ ($SD = 0.73$) for certain knowledge. Based on the epistemological questionnaire, 11 students were asked via email to participate in the research. Most of the participants had relatively strong beliefs (in either direction) of one or two dimensions of Schommer's (1990, 1993, 1998) four epistemological factors. Although Sara seemed to have average scores of the epistemological dimension, she was also asked to participate in the study because she was a project manager. Each participant's profile is presented in Table 2.

Table 2. *Participants' Profiles*

Courses	Name	Age	Race	Teaching experience	*M* of each epistemological dimension for each participant			
					Fixed	Simple	Quick	Certain
Beginning	Susan	48	Caucasian	Yes	2.00	2.25	1.45	1.00
	Jennifer	23	Caucasian	Yes	1.94	2.68	1.64	3.50
	Mary	39	Caucasian	Yes	2.61	2.57	1.91	1.33
	Brian	50	Caucasian	No	1.72	2.43	1.82	2.00
	Julie	49	Caucasian	No	2.06	2.18	1.45	2.33
Intermediate	Emily	27	Caucasian	Yes	2.61	2.75	2.55	3.33
	Tom	33	Caucasian	Yes	2.22	2.21	1.91	2.50
Advanced	Sara	56	Caucasian	Yes	2.00	2.25	1.91	1.67
	Scott	32	Caucasian	No	1.78	2.82	1.73	3.17
	Beth	27	Caucasian	Yes	1.89	2.07	1.55	1.33
	Katie	29	Caucasian	No	1.56	2.07	1.64	2.00

Note. Sara and Katie were project managers.

Data Sources

The primary data sources for this study included in-depth interviews with students and examples of student writing, such as reflection journals, project documentation, and reports. Field notes from classroom observations were collected to supplement the primary data. Figure 6 provides the data sources used for this study.

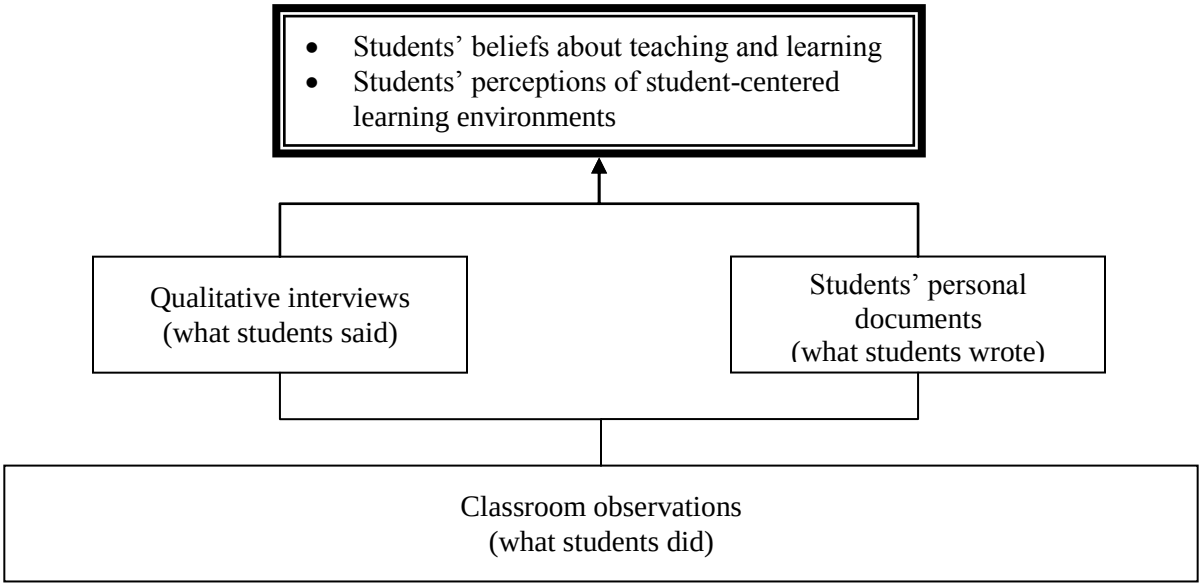


Figure 6. Data sources.

Semi-structured Qualitative Interviews

The main purpose of the qualitative interview is to gather participants' perspectives on the world, and thus to understand what they experience and how they make sense of their world. Qualitative interviews with participants were conducted three times for the beginning course students and twice for students in the intermediate and the advanced courses throughout the semester in order to capture students' beliefs about teaching and learning, their perceptions of student-centered learning environments, and their learning experiences. The participants in the beginning course were interviewed three times because they were new to the course and because individual projects for the course started at the middle of the semester. Before the midpoint of the semester, instructional approaches seemed to be very similar to those of traditional classrooms. Students were supposed to master multimedia tools that they chose to learn and were gradually encouraged to start their individual projects on their own. By conducting three interviews, I was able to collect information about challenges and difficulties that students in the

beginning course might experience at the early stage of the beginning course and to examine whether students' beliefs about teaching and learning would change over the course of a 16-week semester. In addition, I was able to compare the patterns among the participants from different stages of the *Studio Experience* to determine whether the entire *Studio Experience* would bring about positive learning experiences and further changes in beliefs toward more constructivist, student-centered approaches. The interviews were semi-structured to make sure that all relevant topics were covered. With semi-structured interviews, I was able to collect comparable data across participants. The interviews, which ranged from 30 to 60 minutes, were tape-recorded.

Writing Assignments

Each of the *Studio* courses had different writing assignments throughout the semester. Students in the beginning course had to create a Web-based design journal in which they reflected on their learning experiences and assigned articles. Students in the intermediate and advanced courses were required to write weekly project reports reflecting on the progress of their projects and learning experiences.

Classroom Observations

The purpose of classroom observation was to better understand the research setting (Patton, 2002). The researcher observed classroom activities, focusing particularly on the beginning course, and took field notes. The field notes were used to keep track of events and to complement students' interviews with respect to contextualization. Figure 7 shows the primary data sources used to answer each research question.

Research Questions	Data Sources			
	First interview	Second interview	Third interview	Writing assignments
1. How are students' beliefs about teaching and learning compatible with the expectations of student-centered learning environments?	X			X
2. How are students' beliefs about teaching and learning related to their perceptions of the *Studio Experience*?	X	X	X	X
3. How do students' learning experiences in the *Studio* influence the change in their beliefs about teaching and learning?	X	X	X	X

Figure 7. Research questions and data sources.

Data Collection Procedures

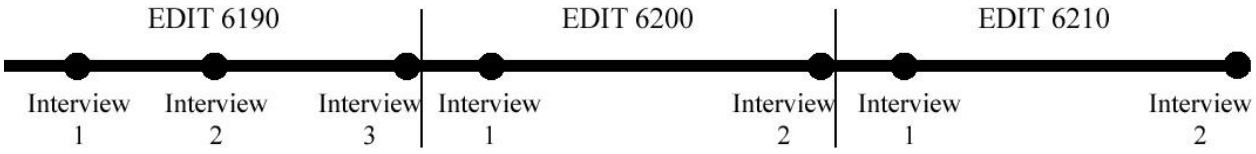
Data for this study were collected in the *Studio* course for 16 weeks during the spring semester of 2008. Research materials, including a student survey (see Appendix A) and interview protocols, were developed by the researcher. In addition, permission to use Schommer's Epistemological Questionnaire (Schommer, 1998) and approvals to conduct this research study in the *Studio* course were obtained (see Appendix B). Finally, an Institutional Review Board (IRB) application for this research was approved (see Appendix C).

I introduced students to this research study at the beginning of the courses by explaining the purpose of the study, participant selection techniques, and data collection procedures. Then, I administered the student survey and the epistemological questionnaire. Based on the survey and the questionnaire, eleven participants were selected, and all of them agreed to participate in this study.

Interviews with four participants in the beginning course were conducted three times (at the beginning, in the middle, and at the end of the semester). However, since Jennifer dropped the course in the middle of the semester, I was only able to interview her two times, at the

beginning and the end of the course. The participants from the intermediate and the advanced courses were interviewed twice (at the beginning and at the end of the semester), as planned. The focus of the first interview was on students' initial beliefs about teaching and learning and their initial perceptions of student-centered learning (see Appendix D). The midpoint interviews with the beginning students focused on challenges and difficulties that they may be feeling around the midpoint of the course (see Appendix E). The final interview asked the participants about changes in their beliefs about teaching and learning and their perceptions of the courses, as well as their overall learning experiences in the courses (see Appendix F). The timeline for the interviews is illustrated in Figure 8. Each interview was tape-recorded and transcribed for data analysis purposes.

The beginning course (5 participants)	**The intermediate course (2 participants)**	**The advanced course (4 participants)**
Week 1: Participant selection Weeks 2-3: First interview Weeks 7-8: Second interview Week 16: Third interview	Week 1: Participant selection Weeks 2-3: First interview Week 16: Second interview	Week 1: Participant selection Weeks 2-3: First interview Week 16: Second interview



Note. Jennifer, a student in the beginning course, was only interviewed twice because she withdrew from the course.

Figure 8. Timeline of data collection.

Data Analysis

According to Lincoln and Guba (1985), data analysis is a process of reconstructing respondents' constructions into meaningful wholes; thus, qualitative research mainly involves

inductive data analysis. Central themes, patterns, and categories emerge from the data. According to Bogdan and Biklen (1982), data analysis involves "working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others" (p. 145). In qualitative research, data analysis is an ongoing activity, meaning that it begins as researchers collect data instead of waiting for the end of data collection (Maykut & Morehouse, 1994). As soon as they begin collecting data from the field, researchers try to make sense of the data and to develop initial categories for further analysis.

Qualitative data analysis, specifically the inductive approach, was used in this study. Inductive analysis begins with empirical data, with important patterns, categories, and concepts emerging from the data. All of the interviews for this study were audio-taped and transcribed immediately after they were conducted. The first step of data analysis was qualitative coding to reveal potential meanings of the data (Charmaz, 2000, 2006). In qualitative data analysis, coding is essential in that, through coding, researchers begin to move from description toward conceptualization (Charmaz, 2002). Corbin and Strauss (1990) introduced three basic types of coding: open, axial, and selected coding. Open or initial coding is a process by which researchers define what is happening in the data and name actions and events. Then, actions and events are compared with other incidents, and similar incidents are grouped into categories. In axial coding, each category is related to other categories, and subcategories and further categories are developed. Finally, in selected or focused coding, researchers synthesize categories into a core category that represents "the central phenomenon of the study" (Corbin & Strauss, 1990, p. 14).

Data analysis began with initial open coding (Charmaz, 2006), which involved reading the transcripts carefully and conducting line-by-line coding. Personal documents, such as students' Web-based design journals and weekly update reports, were also coded for further analysis. The open coding was useful in that the coding strategy allowed me to look closely at the data. In the line-by-line coding, interview data were coded using the participants' language—*in vivo* codes (Charmaz, 2006). Charmaz argues, "*In vivo* codes help us to preserve participants' meanings of their views and actions in the coding itself" (p. 55). The open coding led me to discover important events, experiences, ideas, and conceptions, and to develop initial conceptual categories (see Appendix G).

Then, I used the *comparative method* to refine the initial categories and to discover new categories and relationships among them (Glaser & Strauss, 1967). The comparative method is the most fundamental method in the analysis of grounded theory. Even though the grounded theory approach aims at generating a theory, I found it useful for discovering patterns across the cases and developing categories and themes from the data. Through the comparative method of data analysis, the initial categories developed in the initial coding of each interview transcript were compared for their commonalities, differences, and patterns, and major themes and patterns across categories were identified (see Appendix H). Once major themes and patterns emerged, relationships among them were hypothesized and tested. Figure 9 illustrates the data analysis procedures used in this study.

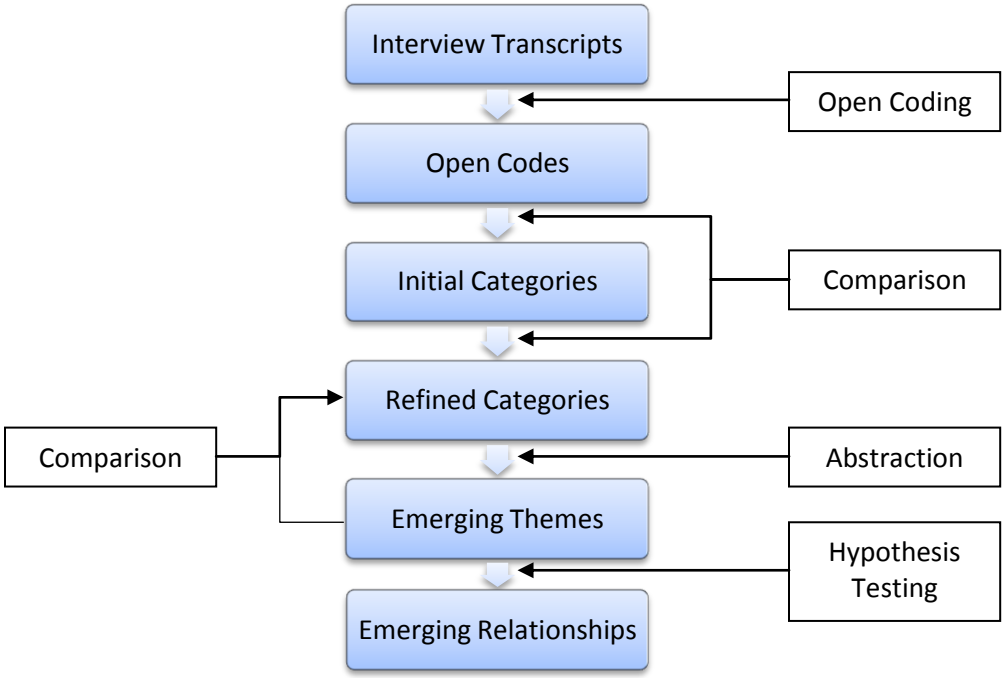


Figure 9. Data analysis procedures.

Validity and Reliability

Validity and reliability of research findings have always been an important issue in educational research. While validity has been defined as "the trustworthiness of inferences drawn from data" (Eisenhart & Howe, 1992, p. 644), reliability is concerned with the replicability of research findings using the same research design in the same context (LeCompte & Goetz, 1982). According to LeCompte and Goetz, because of the nature and the assumptions of qualitative research, qualitative researchers have approached reliability by precisely specifying the research design, including researchers' roles, data collection and analysis procedures, and presentation of findings. Lincoln and Guba (1985) presented ways of dealing with the quality of naturalistic inquiries, including prolonged engagement, persistent observation, triangulation, negative case analysis, peer review or debriefing, member check, presentation of findings grounded in data, rich and detailed description, and external audit.

Given the importance of establishing validity and reliability, I incorporated several methods, including extended time in the research setting, identification of my subjectivity in relation to the context, data triangulation, detailed description of the research design and methods, and presentation of findings in relation to the data collected during this study (LeCompte & Goetz, 1982; Lincoln & Guba, 1985). In the following section, I describe my role and position, as well as my subjectivity. The data I collected from multiple sources, including qualitative interviews with students, classroom observations, and students' writing assignments, were used for data triangulation. I detailed the research design methods, including participant selection, description of the research field, and methods of collecting and analyzing data, as well as presentation of findings. Finally, I presented findings with supporting data for readers to assess my claims and interpretations (Freeman, deMarrais, Preissle, Roulston, & St. Pierre, 2007). The next section addresses the issue of subjectivity and my role in this study.

Researcher's Role and Subjectivity

According to Lincoln and Guba (1985), in qualitative research, human researchers are the primary instruments for data collection because only the human instrument is able to understand multiple realities, where every participant interacts with and influences other elements; that is, qualitative researchers have been regarded as the only instruments for dealing with data. Therefore, qualitative researchers have acknowledged that the personal values of qualitative researchers have an impact on various research processes, from selecting research problems and determining research methods of data collection and analysis to interpreting research findings (Freeman, et al., 2007; Lincoln & Guba, 1985). Thus, subjectivity is regarded as an invariable and inevitable component of social research (Peshkin, 1988).

Qualitative researchers have been concerned with their own subjectivity and its effect on the data and findings (Bogdan & Biklen, 1982). Because of the use of the *human as instrument* (Lincoln & Guba, 1985, p. 192) perspective and the personal values of qualitative researchers, it is important that qualitative researchers recognize and acknowledge their assumptions, theoretical orientations, and personal biases to enhance the validity and reliability of their studies (Merriam, 1998). Much like qualitative researchers are concerned with making sense of how participants view and interpret their worlds, their audiences also construct their own meanings from the research. Therefore, the clarification of researchers' subjectivities also helps readers to construct meanings from researchers' interpretations of participants' constructions of their experiences.

As I mentioned in Chapter 1, the theoretical orientation and assumptions in this study were influenced by my personal experiences in the research setting as a student and a teaching assistant. My learning experiences made me ponder the conflict between students' initial beliefs about teaching and learning and the assumptions and expectations of teaching and learning in student-centered learning environments. Additionally, my experiences gave me the idea of changing students' beliefs about teaching and learning through their learning experiences in student-centered learning environments. The following assumptions, in particular, influenced the research questions of this study:

1. Most of the beginning *Studio* students would have reproductive beliefs about teaching and learning.
2. There would be a strong relationship between students' beliefs about teaching and learning and their perceptions of the *Studio* courses.

3. Students would change their beliefs about teaching and learning as a result of their learning experiences in the *Studio*.

Therefore, in conducting this research study, I hoped to explore students' beliefs about teaching and learning, their perceptions of student-centered learning environments, and the possible changes in their beliefs. I believe that the research findings from this study can help educational practitioners design and implement student-centered approaches in their courses.

Limitations

Research outcomes in qualitative research are influenced by "the nature and quality of the interaction between the knower and the known" (Lincoln & Guba, 1985, p. 41); thus, it is possible for there to be different meanings and interpretations of the same data. For this reason, naturalistic inquirers tend to hesitate to generalize the findings of their research to other contexts (Lincoln & Guba, 1985). Because of the nature of qualitative research, this study did not intend to generalize its results; rather, it aimed for a deeper understanding of beliefs, perceptions, and experiences of students from their own perspectives.

There is also a concern regarding validity of self-reports. This study relied on participants' self-reports or their responses to interview questions. However, the limitations of using the self-report have been recognized (Pryor, 1980). Pryor argued that self-reports are often inconsistent or can be habitual responses, suggesting that self-reports may not be sufficient for predicting behaviors and explaining beliefs and perceptions. Even adults, for example, are not aware of what they know about themselves (Assor & Connell, 1992). Thus, there is a possibility that students might share ideal beliefs about teaching and learning instead of their actual beliefs. Some may be attracted by the term student-centered learning, but may not be well prepared to learn in such environments.

There is a need to consider the impact of the academic department on students' beliefs about teaching and learning and their perceptions of student-centered learning. A few participants recognized that the majority of the courses provided in the department were student-centered. Therefore, one should be cautious about concluding that the changes in students' beliefs resulted exclusively from their learning experiences in the *Studio*.

Delimitation

This study aimed to better understand students' learning experiences in relation to their beliefs about teaching and learning and their perceptions of the *Studio* courses. Therefore, participants were selected to maximize variation in terms of their epistemological beliefs, ages, and prior experiences in the *Studio*. There were seven international students in a total of 32 students in the *Studio*. International students obviously have different cultural backgrounds and prior learning experiences, which may lead them to have totally different beliefs about teaching and learning, perceptions of the *Studio*, and overall learning experiences. However, since I wanted to focus on students' beliefs about teaching and how these beliefs influenced their perceptions of the *Studio*, I did not want to include other important aspects that could influence their learning experiences, such as cultural differences and language barriers. Therefore, I decided not to include international students in order to make this study feasible and manageable; the interaction between international students' beliefs about teaching and learning and the *Studio* courses may have been influenced by their different cultural backgrounds and different levels of English proficiency. I suggest that future research focus on international students' learning experiences in relation to their beliefs about teaching and learning.

Ethical Considerations

There are unique ethical considerations to qualitative research in education (Deyhle, Hess, & LeCompte, 1992). In qualitative research, researchers build special relationships with participants through which the researchers are able to access research settings and collect data. Unlike other forms of research, qualitative research requires participants to disclose their personal feelings, beliefs, or perceptions. According to Deyhle et al., "The level of shared knowledge and the sense of responsibility felt by researcher and participants is high" (p. 619) in qualitative research. Because qualitative researchers seek rich, detailed information, ethical issues may emerge in the collection and analysis of data and the dissemination of findings (Merriam, 1998). Therefore, it is critical for researchers to ensure that participants are protected from any potential risks during and after the research.

All of the research materials in this study were reviewed and approved by the IRB (see Appendix C), and I followed the guidelines of the IRB for human subjects research. I informed each participant of the purpose of this study and the procedures of data collection and told them that they could always refuse to participate in this study during any part of the research. Each participant read and signed the consent form prior to involvement in the study (see Appendix I). The interviews took place in a quiet room and were audio-recorded. Audio-tapes and interview transcriptions were stored in a secure place. In addition, pseudonyms were used in the dissemination of findings to ensure confidentiality.

Chapter Summary

This chapter described the research methodology for this study. This study was intended to explore students' beliefs about teaching and learning and the relationship of these beliefs with students' perceptions of student-centered learning environments. A qualitative research

methodology was selected and designed to address the purpose of the study. I described the research settings, participant selection, and data collection and analysis procedures. This chapter concluded by discussing issues of validity, reliability, subjectivity, limitations and delimitations, and ethical considerations of the study.

CHAPTER IV

PARTICIPANTS' PROFILES

This chapter presents each participant's profile, which contains individual's backgrounds, previous learning experiences and prior knowledge about multimedia computer tools, and beliefs about teaching and learning. These individual profiles partly answer the first research question of this study: How are students' beliefs about teaching and learning compatible with the expectations of student-centered learning environments?

Two main categories emerged from the collected data to address the first question: comparability in belief and salient favorites in teaching and learning. The comparability in belief about teaching and learning with the expectation of student-centered learning environments was determined based on the general categories identified by Kember (1997), Gow and Kember (1993), and van Rossem et al. (1985). Kember identified two broader categories of teaching, teacher-centered/content-oriented and student-centered/learning-oriented conceptions. Gow and Kember also found two general conceptions of teaching, knowledge transmission and learning facilitation. Van Rossum et al. identified two general conceptions of learning, which were the reproductive and the constructivist views of learning. Two broad categories of teaching and learning were adapted for this study: the reproductive belief and the constructivist belief. Figure 10 shows the two broad categories along with selected examples from the data collected in this study.

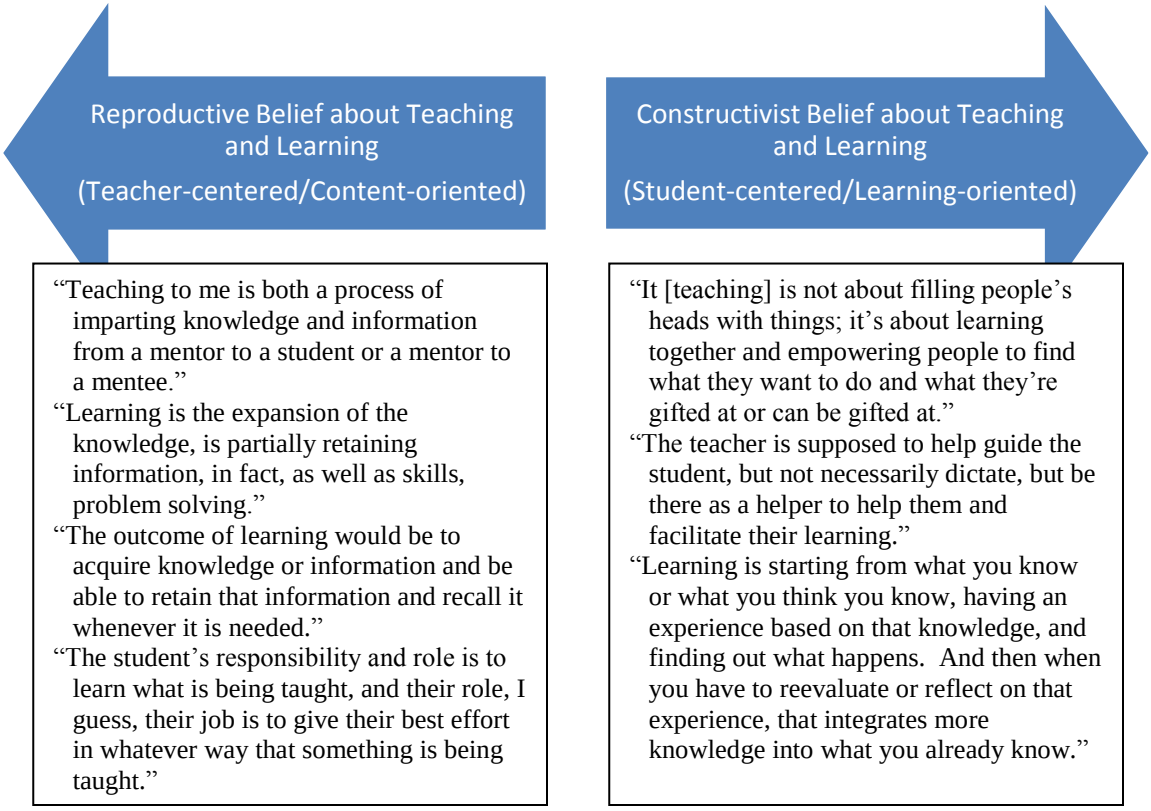


Figure 10. Selected examples of reproductive and constructivist beliefs about teaching and learning.

The salient favorites in teaching and learning refer to teaching and learning methods or approaches that the participants believed had been effective for their learning. Therefore, the salient favorites are the most effective methods that the participants would like to see in any learning contexts. Julie, for example, believed that she learned better when there was discussion and reflection, and thus, she expected to have an opportunity for discussion with others and reflection in classrooms.

The participants' profiles, along with their beliefs about teaching and learning, were used to compare their perceptions of student-centered learning environments and the changes of their beliefs, which addressed the second and the third research questions of the study (see Chapter V). Each individual's beliefs about teaching and learning are presented here, based on the phases of

the *Studio* in which they were enrolled: beginning course, intermediate course, and advanced course. Each section begins with the descriptions of the courses, followed by the participants' profiles.

The Beginning *Studio* Course

The beginning course of the *Studio* featured the mastery of authoring and multimedia tools. While authoring tools refer to computer programs used to design technology-enhanced learning environments, multimedia tools are intended to produce rich forms of media for learning environments, such as graphics, animations, and movies. There were many tool options from which students could choose, such as Dreamweaver®, Fireworks®, Flash®, Photoshop®, and Illustrator®. The teachers in the *Studio* recommended widely-used tools and provided a brief introduction to the recommended tools in workshop sessions. Although students were allowed to propose what tools they sought competence, most of them tended to focus on Dreamweaver® and Fireworks®. Those who had already known how to use Dreamweaver® and Fireworks® often chose Flash® as their tool. The mastery of multimedia tools was accompanied and supported by an independent project, reflection through a Web-based design journal, and peer feedback called *Desk Crits*. The independent project was intended to facilitate individual tool learning. Reflection involved relating individual learning experiences to literature, while *Desk Crits* involved giving and receiving peer critiques on individual projects.

The beginning course is usually divided into two main stages: tool learning and independent project. The first half of the semester was devoted to learning tools that students wanted to master. Students selected what tools they wanted to master and spent time learning them. Teachers provided a series of workshops for introducing a few suggested tools in order for students to get started. Students learned tools through the workshops, tool manuals, and various

resources around them. While focusing on learning tools, students began to think about what projects they wanted to accomplish that would apply their knowledge of and skills with the tools. The focus of the course changed at the midterm to the independent project and students began to develop their products individually. The mastery of tools in the beginning course of the *Studio* was intended to be initiated by individual tool learning and accomplished by the independent project.

Susan

Susan was a 49-year-old female who was a part-time student pursuing an educational specialist degree in the Instructional Design and Development (IDD) program. Susan had been a special education teacher for 20 years and had become interested in applying technology to help students with disabilities. She had earned nine credit hours toward her program of study, but had not taken any of the *Studio* courses prior to her participation in this study. She had a typical traditional learning experience in school, such as going to class, listening to lectures, taking notes, and taking exams. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she had a relatively strong belief about gradual learning and context-dependent knowledge. She believed in the effects of work and efforts on learning and performance; if students put more time and energy into something, they will improve.

Susan had no previous knowledge of multimedia design and development tools such as Dreamweaver® and Fireworks® prior to entering the beginning *Studio* course, but she wanted to be proficient with modern multimedia tools. She believed that she needed to spend as much time as possible to learn them and do the required assignments. She thought she should be self-directed and cooperative in the *Studio*.

Compatibility in belief. Susan believed that the *Studio* approach would match her learning style and belief about teaching and learning. Susan regarded teaching as guidance-providing skills and support to help students prepare their professional works rather than one-way instruction focusing on transmission and memorization of information. Therefore, she believed that teachers should be facilitators or guides, accepting diverse learning types, abilities, and backgrounds and scaffolding students' learning. Learning, for Susan, makes an individual's life rich and productive by allowing them to accomplish something, get a job they enjoy, and be successful in life. She believed that students should be responsible for their own learning, doing assignments, reading, participating in learning activities, interacting with others, asking questions, and having a good attitude. However, because Susan felt that some students might not be accustomed to having ownership of their learning, she emphasized the importance of transition, by which students could become independent learners and use the freedom of learning would be gradually given to them. She believed that teachers should support the transition of students from dependent to independent learners.

Salient favorites in learning. Susan liked to have clear objectives and directions with which to begin with a project. While she liked to know what she would need to accomplish by the end of semester, she also wanted to have options to choose from in terms of materials, tools, and resources. She liked the IDD program because she learned better through hands-on activities, or trial and error, and she was provided with options and suggestions rather than rigid directions in terms of learning materials, resources, and individual projects. Although she had learned a lot from traditional lectures, she did not appreciate a one-way lecture without interaction. Instead, she wanted teachers to be more accessible and to provide guidance and feedback. She also

enjoyed working in groups because she believed that she could learn more from working with others with different perspectives.

Julie

Julie was a 49-year-old female who was a part-time student pursuing a master's degree in Adult Education. She was taking the beginning course of the *Studio* to learn multimedia design tools to create a distance learning environment. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she had a strong belief that knowledge is complex and integrated, rather than simple and isolated, and that an individual's ability to learn can be improved with experiences over time.

Although Julie had years of work experiences with computers, she did not know much about multimedia design and development tools. She did not regard herself as an active learner, but she hoped to become an active participant in the *Studio* course. Julie believed that she was intrinsically motivated, ready to take on a challenge and engage in learning. Although she had mostly taken knowledge-centered or material-centered courses, she had a similar course to the *Studio* in a graduate course that was about service-learning; she really appreciated service-learning, and while in that class, she worked on a real project that could impact the community.

Compatibility in belief. Julie's beliefs about teaching and learning reflected a constructivist paradigm, as she was a strong proponent of service-learning. She appreciated the power of the concept of service-learning and saw similarities between service-learning and the *Studio*. She described her service-learning course:

> The [service-learning] course was designed so that we each had to decide on a project, very much like we do in the *Studio*, where they have to have a client. Well, we needed someone outside in the community to work with, find out what they needed, and try to

> work with that and create a project from that. It was a community development class. And it was that reality, also, meeting with outside clients, finding out what they wanted and realizing that we had talents to impact that situation. It made it…much more tangible and much more important that we worked together successfully so that it wasn't just an exercise in the classroom.

The focal point, for Julie, in learning situations should be placed on students. Julie strongly believed that learning is a student's responsibility and that students benefit from learning through hands-on experiences it is more effective with the responsibility to learn through experience. Thus, students should be ready to engage in learning, taking information and connecting it to real life. The development of a learning community is also the responsibility of students. Students need to know why they are in the class and should be an active member of the learning community, getting involved in the learning process and being willing to help each other.

Julie regarded teachers as a co-learners or mentors. She described teaching as learning, sharing, interacting, exploring together, and empowering students to contribute to the society. As co-learners, teachers need to create learning environments in which people learn together; these environments should also be open to discussion and should provide necessary resources and support. The learning environment should give students enough structure in the beginning and allow them to work together. Therefore, teachers, previously placed at the center of the learning community, become a member of the learning community, empowering students to discover what they want and their areas of strength.

Salient favorites in learning. Julie liked to learn through experiences, gaining knowledge and connecting it to what she already knew. Based on real experiences, she liked to have

discussions or other learning activities through which she could have a lot of interaction and support:

> I think learning in discussion with other people was one of the most effective experiences as a student, talking together with a group of people about what you know and what you're learning and what you think about your learning is just so important. Trying to learn in isolation is…probably not impossible, but it's much more difficult.

Julie also expressed an affinity toward self-directed learning. She liked to figure things out on her own, believing that learning is much more effective when students take responsibility for their own learning.

Mary

Mary was a 39-year-old female, full-time student pursuing a doctoral degree in Special Education. She had been a teacher for five years and had working experience using computer programs. She had earned 18 credit hours toward her program of study, but this was her first course of the *Studio*. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she seemed to have a relatively strong belief about fixed ability and context-dependent knowledge.

Mary wanted to learn Dreamweaver® in order to integrate technology into her class. Although she did not have prior knowledge in Dreamweaver® and Fireworks®, she enjoyed computer technology and believed that she had good knowledge and skills about computer software. She considered herself to be a self-directed and self-motivated learner and felt that she was good at managing time, knowing where to find resources, and learning from them. Most of her previous learning involved teacher-directed instruction, and she had not had any learning experiences in student-centered learning environments.

Compatibility in belief. Mary's belief about teaching and learning seemed to be compatible with the expectation of student-centered learning environments. She believed that one of the most important tasks for a teacher was not to pass knowledge on to students, but to get students to know where and how to find information and resources and how to learn from them. Mary believes that while teachers should have knowledge and care about students, they should show students how to find resources and how to learn from them:

> Good teaching is just not lecturing, it's getting the kids to think and getting them to know where to find the information. It's not just about knowing all the facts, it's how to find the information and how to work together and know who to ask, not ask questions of what is the answer, but ask questions, "Well, how did you get that?" And a good teacher really cares about their students.

Mary believed that teaching students how to construct knowledge using available resources can empower students to be able to learn on their own throughout their lives. Also, Mary emphasized that learning should involve getting knowledge and skills and putting them into practice. Students should participate in learning activities, share thoughts, and ask questions in order to learn what they are expected to learn.

Salient favorites in learning. Mary believed that she had an intrinsic motivation to learn new things, and thus enjoyed learning. She had enjoyed classes where she could listen to lectures, discuss with others, ask questions, and apply what was learned to real situations. She felt that she learned better through hands-on activities, discussion, and field trips:

> I love every class that I've taken, learning something new and being able to put it to use. I can see myself really in a class, learning something the rest of my life. It's just enjoyable.

Even though Mary did not like lecture-only classes, Mary preferred having her classes begin with lectures. She had strong self-efficacy about learning with resources, believing that she could learn what she wanted to learn with resources. Thus, it appears to be essential to her for teachers to provide resources and for students to know where to find information and resources.

Brian

Brian was a 50-year-old male, part-time student pursuing a master's degree in the IDD program. He had been working in computer-related jobs for 25 years. He described himself as a career changer, from a practicing computer programmer to a teaching position in academic environments. He was fascinated with the applications of technology in education and decided to study instructional design. He had earned six credit hours toward his program of study, but he had not taken any of the *Studio* courses before. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), he seemed to have a relatively strong belief about integrated knowledge rather than simple knowledge.

Brian considered himself to become a self-directed learner. Although his learning experiences were mostly in structured courses in which he did not have much freedom in learning materials, assignments, and projects, he did not enjoy teacher-directed courses. Brian had done independent work with guidelines and structure, and felt that he learned a lot from the independent work experiences. Although he had been working in computer-related jobs, he felt that he had limited knowledge and skills in Dreamweaver® and Fireworks®. In the *Studio*, he expected to learn the tools and to be able to apply his knowledge of and skills in instructional design to real situations.

Compatibility in belief. Brian's beliefs about teaching and learning seemed to be compatible with the reproductive belief. Although he did not enjoy teacher-directed instruction,

Brian's beliefs about teaching and learning were more toward teacher-directed instruction than student-centered learning because he had learned mostly in traditional classes. He regarded teaching as a process of imparting knowledge and information, helping learners grow and develop their expertise. Thus, he thought that while helping students to become engaged and interested in learning, teachers should help students expand their knowledge and their perspectives. Brian described a teacher as a guide on the side, emphasizing the guiding and scaffolding of student learning. Also, he believed that learning involved expanding knowledge, retaining information, and solving problems. He emphasized the importance of learning communities, noting that students should be an active participant in the learning process as a part of a learning community, sharing knowledge with others:

> I think the student role, as I see it, is to…aid, be an active participant in the learning process. To me, being a student, hopefully, I can not only learn, myself, from a good teacher or a good mentor, but I can hopefully impart knowledge to my co-students, to the teacher himself or herself. So, it is really, to me, being a student is being part of a community, part of a class of others individuals, other people and…making it…you've heard the word, symbiotic, is a way for me to learn and me to teach at the same time that I'm learning, so to me, that's a big part of being a student, is to share what I know with other students.

Salient favorites in learning. Brian had worked in computer-related jobs that required many independent searches for information and problem solving. Thus, he enjoyed learning independently with resources and having a "guide on the side." Brian felt that he learned well by taking good notes and researching information on his own. While he enjoyed working independently, he also liked to have interaction with others:

> I have a real liking for that method of learning [independent work and research], that method of learning of the teacher teaching in a way that they kind of guide you, they scaffold you, but they don't hold your hand; they gently guide you or they are there to answer questions when questions arise…Like a guide on the side as opposed to kind of a more controlling environment with teacher kind of dictates the terms in the classroom, they largely are very controlling of your work independently. It has to be done exactly this way, and there is very little room for creatively...I don't enjoy that type of environment as much and don't do as well in that type of environment as in an environment where there is much more self-regulated, more independent learning that goes on, where the teacher is much more of a mentor and a guide as opposed to a kind of a pedagogical model of the teacher up in the front of the room, sharing the information and then having you spout it back to them.

Jennifer

Jennifer was a 23-year-old female, part-time student who was pursuing a master's degree in the IDD program. She held a bachelor's degree in Early Childhood Education and had been an elementary teacher for one year. She had earned six credit hours toward her program of study, but she had not taken any of the *Studio* courses before. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she seemed to have a strong belief about certain knowledge.

Before the semester started, Jennifer was very excited about the course and her project. She knew that she needed to be active, asking others for help in the *Studio*. However, she also had a concern about the *Studio* because she was accustomed to being told what to do and felt comfortable in teacher-directed instruction. Indeed, she was not used to the *Studio* approach and

felt that the syllabus was too open-ended; she would have preferred that it describe what to do in detail. Moreover, although she had used Dreamweaver® before, she had not used it recently. Therefore, she felt that she needed to catch up with other students.

Compatibility in belief. Jennifer had a relatively strong constructivist belief about teaching and learning. Jennifer definitely focused on learning over teaching. She regarded even teaching as a process of continuing learning. While helping students learn and reach their fullest potential, and thus become better people with knowledge and skills, teachers continue to learn and grow professionally. She believed that a teacher in the classroom should be a facilitator or guide instead of being a dictator:

> If a teacher is doing all the lecturing and they are just standing up telling a student, "You need to know this, you need to know this, you need to know this," and the student doesn't really understand why they [*sic*] need to know it, they're not really getting the material. So, I think that's the difference between a person dictating the information and a person facilitating the information.

Learning, for Jennifer, should be regarded as a continual process of gaining knowledge and skills and becoming a better person. Through learning, students widen their perspectives with gained knowledge and skills. Jennifer believed that students should be active and participate in group work, teaching each other and taking responsibility for their own learning. She also believed that learning environments could influence student learning.

Salient favorites in learning. Jennifer believed that she learned a lot by listening and applying what she learned to real problems. She liked hands-on experiences, as well as lectures. She had a high level of confidence in learning because she had never struggled with learning in

classrooms. She described herself in the classroom as one who usually sat back and listened to lectures, but became active in small groups:

> I do feel like I'm active in that sense, but I don't actively participate as in talking or saying things. But when we get into the smaller groups, I'm, like, asking questions and saying stuff a lot because I feel a lot more comfortable telling my insecurities in there than I do in the bigger group, where I feel like everyone knows more than I do.

The Intermediate and Advanced *Studio* Courses

Both the intermediate and the advanced courses of the *Studio Experience* focused on authentic instructional design projects. The difference was that while students in the intermediate course applied knowledge and skills of instructional design and tools individually, the advanced course adopted a team-based approach. The intermediate course of the *Studio* featured individual application of the mastery of tools achieved in the beginning course, as well as instructional design skills, through the design and development of technology-enhanced learning environments. Thus, only those who had completed the beginning course could take the intermediate course. Students would find their own clients and discuss possible project ideas. Once they decided on individual projects, students worked through the entire process of design and development of learning environments individually, from analysis and design to development and evaluation of the projects. This independent project was supported by teachers, design workshops, and peer feedback.

The advanced course of the *Studio* featured a team-based application of instructional design skills and the mastery of tools. Students in this course were expected to work in teams in order to design and develop technology-enhanced learning environments. The team process was designed to approximate instructional design projects in reality. Students had an opportunity to

elaborate their skills regarding instructional design and tools through this team-based approach. Upon completion of the advanced course, the *Studio* would expect students to be ready as an instructional designer in a community of practice. Students were supported by the instructor, peers, and other resources during this process.

Tom

Tom was a 33-year-old male, part-time student who was pursuing a master's degree in the IDD program. He held a bachelor's degree in Early Childhood Education and had been an elementary teacher for six years. Tom had a great interest in integrating technology into his classroom. He had earned 12 credit hours toward his program of study and had taken the beginning course of the *Studio Experience*. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), his beliefs seemed to be most comparable with integrated knowledge.

Tom believed that he had learned a lot from the beginning course of the *Studio* and that he had had a good learning experience. Although he did not have much previous experience in Web development at the beginning of the *Studio*, he left the course with confidence regarding the tools he used in it. He was excited to develop something relevant to his teaching job.

Compatibility in belief. Tom's beliefs about teaching and learning had been formed through his experiences in teacher-directed instruction and seemed to be aligned to the reproductive belief. However, he explained that his teaching practice had been moving toward student-centered learning. Tom believed that teaching involved imparting knowledge and helping students grow with knowledge. A teacher's role is to become a facilitator, giving opportunities and tools for students to learn and grow. Teachers are responsible for students' growing and for facilitating knowledge transition. Tom regarded learning as knowledge

acquisition through everyday experiences. Students are also responsible for their learning and should do their best in absorbing what is being taught.

Salient favorites in learning. Personally, Tom learned effectively through hands-on activities as well as lectures. He believed that he learned better in learning environments where tools, resources, and support were provided. Tom expressed frustration and confusion while enrolled in the beginning *Studio* course because of the lack of clearly defined directions and felt a need to have some more precise directions. Although he was fine with self-directed learning, he believed that it would be easier to work toward something that had rubrics and clear expectations:

> So, I'm actually okay with me self directing where this goes, I've built up a little bit of confidence over these few courses that I feel that I can do that. Yeah, there is still that part of me that still likes to have a little bit of direction.

Emily

Emily was a 27-year-old female, part-time student who was pursuing a master's degree in the IDD program. She had been an elementary math teacher for four years. She was interested in applying technology in teaching math, hoping that children would get excited about the technology. Emily had earned 12 credit hours toward her program of study and had taken the beginning course of the *Studio Experience*. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she seemed to have a strong belief about fixed ability, quick learning, and certain knowledge.

Emily felt uncomfortable in the beginning *Studio* course as the *Studio* approach was new to her and it was difficult to get to know people in the class. She was not used to having a lot of freedom in classrooms and was concerned that her discomfort might hinder her learning in the

Studio. She was also overwhelmed by information and felt frustrated and stressful. Emily mentioned that she would have learned more and enjoyed more if she had had more prior knowledge of computer tools. She voiced that she would like to take a course on teaching computer tools in a step-by-step manner.

Compatibility in belief. Emily's beliefs seemed to be closer to the reproductive belief about teaching and learning. Emily emphasized the teacher's role in learning contexts. As a math teacher, she focused on presenting information in such a way that students could understand it easily. Emily recognized that teaching is allowing people to learn in different ways and helping students understand the content, take the knowledge, and build something from it. Ultimately, teaching is for creating lifelong learners who are able to learn independently. Emily noted the following in her design journal:

> My instructional strategy is Instructivism. Having been a teacher for five years has allowed me to be confident with Instructivism for an adult instructional tutorial. My experience has shown me that many of my higher ability learners do well with the presentation of information. They succeed at retaining and comprehending the information presented in this format.

Thus, teachers facilitate learning by designing and developing instruction for students and help students become independent learners. Teachers should have enthusiasm and an excitement about teaching their subject matters and present information in a very structured way in order to motivate students.

Emily believed that learning is for meeting objectives and mastering knowledge and skills. In the long run, as an ongoing process of life, learning is building knowledge to be successful in the world. Students should be actively engaged in learning activities.

Salient favorites in learning. Emily believed that she learned effectively when teachers presented information in a very organized way, which made learning easy. Because she liked to see a big overview in the beginning, she enjoyed lectures incorporating PowerPoint:

> I think for me, it's definitely holistic. I like to see the big picture, and once I see the big picture, they get broke down into modules, into pieces of it that eventually build up to the whole picture of what I'm to learn. I'm visual, I'm auditorial…yeah, the more intelligence used to present material, the more I'm going to learn and take from it.

Emily also shared a learning experience in which she felt she learned a lot:

> One thing that made me learn so much from her is that it was so systematic and organized how she presented to me. It wasn't scattered; it wasn't jumpy. It was like every day, there was so much structure to it that I just felt so successful in there because I could just understand the math concepts and physics concepts and it was just laid out so nicely and mapped out that everything just clicked for me and it made learning easy for me.

She also liked to have examples and individual practices, but did not like to do activities. Although she described herself as a very structured person and liked a concrete structure, she had gotten used to constructivist approaches and found herself enjoyed the constructivist format in the IDD program. During her program of study toward a master's degree, she had been motivated by self-discovery.

Sara

Sara was a 56-year-old female, full-time student who was pursuing a master's degree in the IDD program. She had extensive working experiences in public relations and had taught undergraduate students. Although she did not grow up with technology, she was interested in improving teaching in higher education using knowledge and skills in instructional design, as

well as technology, to teach writing in her own classroom. She had earned 27 credit hours toward her program of study and had taken the first two courses of the *Studio Experience*. It seemed that she did not show a relatively strong belief in any epistemological dimension, according to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998).

Most of Sara's prior learning experiences were teacher-directed instruction involving lectures, books, papers, and tests. She felt that the *Studio* approach was not effective because there was not enough interaction between teachers and students. She felt that the *Studio* did not provide enough support and guidance to the mastery of tools, and thus students often felt frustrated.

Compatibility in belief. Sara recognized that teaching had varying meanings in different settings and that there are different ways of teaching. She liked to consider teachers as guides on the side who were available to help people learn. She had enjoyed learning in the IDD program, which provided guided learning in supportive environments. She also appreciated individual learning styles, personalities, and interests in various learning contexts. Thus, as facilitators of learning and subject matter experts, teachers should help students find their own ways of learning:

> I think the teacher's role is primary a facilitator. Certainly, the teacher also has to sometimes be the subject matter expert, and certainly, if you are the facilitator, you need to be the subject matter expert….But I think the role is helping the students find their best way to learn and their best way to accomplish whatever the objectives are that you've set together to accomplish.

Sara also believed that teachers need to have clear expectations and give constructivist feedback in a timely fashion. Teachers should be accessible when students ask for help.

Learning, for Sara, meant acquiring, applying, and integrating knowledge. Students should take responsibility for their own learning and be actively engaged in learning. Also, she believed that learning is a maturity process. While students out of college do not have an opportunity to take responsibility for their learning, and thus are not ready for learning on their own, older students tend to be more responsible for their learning.

Salient favorites in learning. Sara considered herself to be a problem solver and self-motivated learner. However, she needed to have a structure, such as clear objectives, expectations, guidance, and constructivist feedback in learning situations. She felt that she learned well with the organized information and examples that were provided at the beginning at the course:

> I like to know when I start out what I'm trying to accomplish, so a clear objective is good for me. I find it helpful to have a lecture or presentation or some organization of the information, at least at the beginning, to help me get my brain around what it is I'm trying to learn. So, rather than just giving me the book and say, "Go read this," it is very helpful for me to have several examples, that sort of thing, and from then on it's just benchmarks and guidance and feedback to accomplish whatever we've agreed to accomplish.

Sara enjoyed learning in courses where teaching was tailored and adaptive to individuals' needs and interests. She also liked for her classes to have social aspects, such as discussion with others.

Katie

Katie was a 29-year-old female, part-time student who was pursuing a master's degree in the IDD program. Although she majored in English in her undergraduate studies, she was interested in learning about technology and became a staff member as an instructional designer,

developing instructional programs and materials for faculty members. Katie had not had many experiences in student-centered learning environments before the *Studio*. She had earned 24 credit hours toward her program of study and had taken the first two courses of the *Studio Experience*. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she seemed to have a strong belief that knowledge is integrated rather than isolated and that an individual's ability to learn can be improved over time with experience.

Katie enjoyed the freedom of the beginning *Studio* course because she was able to choose what and how to learn. She liked to learn multimedia design and development tools at her own pace when she had time; as a result, the course was a great experience for her. Katie created a website to provide instructions for knitting, which was her main hobby, for her individual project. Her project included Flash® modules that provided text instructions of skills accompanied by videos showing how to do certain actions. Because the topic was her hobby and she loved to learn and apply Flash®, she enjoyed her learning in the course.

Compatibility in belief. Katie's belief about teaching and learning seemed to fit well with the self-directed learning of the *Studio*. Katie believed that teaching should introduce information and make students want to know more:

> I think [the aim of teaching is] to introduce new information to people and also to get students to ask questions and to have conversations and to hopefully get students interested enough in what is being discussed that they want to know more, to make people hungry for more information.

Thus, teachers need to have enough knowledge to get students started. Additionally, teachers should be available to students and willing to listen to them. Katie recognized that people can learn on their own as well as in classrooms. Through learning, students come to know more and

want to know more. Thus, students should be engaged and willing to participate in class. With gained knowledge, students increase their ability to modify their own perspectives.

Salient favorites in learning. Katie believed that she was a self-directed learner and enjoyed learning in classrooms, actively participating in learning activities. She also believed that she had good technical skills and loved to learn new computer programs. Indeed, she learned a lot of programs related to her job on her own:

> I think I probably liked school. And always felt really motivated to do well in school, and so I am motivated, too, by getting a good grade, particularly now that my degree relates closer to my job. I'm also motivated by wanting to know things that will help me be better at my career and just wanting to know more about learning theories and wanting to know more about working with clients, that kind of thing.

Katie liked to learn by doing. She enjoyed small group discussion and activities because they provided her with opportunities to apply what she had learned. Her undergraduate courses included a great deal of lecturing, seating in her seat, and taking notes. Katie found the courses boring due to the lack of application of what she learned in the classroom to real life. Because of her interests in exploring things on her own, she did not want teachers to talk about the details of information; rather, she enjoyed self-direction in learning.

Scott

Scott was a 32-year-old male, part-time student who was pursuing a master's degree in the IDD program. He was employed as a technology specialist for a local school system and had a good background in technology. Scott had primarily learned in teacher-directed classrooms and had not had any prior learning experiences in student-centered learning environments before taking the *Studio*. He had earned 15 credit hours toward his program of study and had taken the

first two courses of the *Studio Experience*. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), his beliefs seemed to be most comparable with certain knowledge.

Scott liked the IDD program because it allowed students to focus on what they wanted to learn and what they were interested in. He felt that he learned the most in the beginning course of the *Studio* because it was most compatible with his learning style. Scott expected to get more out of a team-based project experience in the advanced course.

Compatibility in belief. Scott had a relatively strong reproductive belief about teaching and learning that appeared to be formed in his previous teacher-centered classroom experiences. For Scott, teaching meant instruction, or providing knowledge and skills. Thus, he considered teachers to be a vehicle for knowledge. Scott believed that teachers should manage and facilitate student learning and growing:

> I think the role of the teacher is to manage and to facilitate the learning and also to model whatever it is that they are trying to teach. You have to have credibility in order to do that so a teacher has to be someone that is credible, and their aim ultimately is to provide knowledge or be a vehicle for knowledge.

Scott believed that learning is a lifelong process of acquiring new knowledge and information and being able to retain and recall it. He also emphasized that students should be willing to learn and participate in the learning process. Therefore, students should have interests in the subject matters and be motivated to learn.

Salient favorites in learning. Scott considered himself to be an active learner. He believed that he learned effectively by doing. However, he wanted teachers to introduce or show something before exploring it on his own:

> I learn by doing. I have to be introduced to something, and so usually somebody has to show me something or I have to sit in a workshop and see how something is done, and then after that, I learn by doing and by experimenting, just like building something or grading something.

Scott actually enjoyed one course in the IDD program, where learning was much guided from being dependent toward being independent. He described the course as a guided learning experience, as it started as a traditional class and moved toward student-centered learning. Scott also believed that he learned more from group discussion and team works than did from lectures or individual work.

Beth

Beth was a 27-year-old female, full-time student who was pursuing an educational specialist degree in the IDD program. She was a former teacher with three years of teaching experience. She had earned 30 credit hours toward her program of study and had taken the first two courses of the *Studio Experience*. Although she did not need to take the advanced course, she wanted to take to get more practical experiences in instructional design. According to Schommer's Epistemological Beliefs Questionnaire (Schommer, 1998), she seemed to have a strong belief about integrated knowledge, gradual learning, and context-dependent knowledge.

Beth felt that her technical level of multimedia tools was very low, and thus she felt frustration in the beginning course of the *Studio*. She believed that it would be easier to learn computer tools in a step-by-step manner, from the basics to the applications of the tools. She expressed her feeling of frustration and difficulty because the course intended to teach tools, and she did not learn as much as she had wanted. Beth still wanted to improve her technical skills using computer tools in the advanced course.

Compatibility in belief. Beth believed that teaching means helping others transfer knowledge to contexts outside of the classroom. In order to increase transferability of knowledge, students should develop thinking and problem-solving skills. Teachers need to be flexible and accommodating to students' learning styles, personalities, abilities, and individual needs. Beth emphasized feedback and monitoring student learning:

> Teaching means to me that you are an aid in helping somebody else to transfer knowledge, but the transfer isn't necessarily your job; your job is to set up the environment and the scenario where that can take place since you, as the teacher, as the content specialist usually, knows [*sic*] more about the subject matter so to clarify, to give feedback and to monitor that learning is taking place.

Learning, for Beth, is for being knowledgeable, being able to apply knowledge to other situations, making good decisions, and solving problems. Thus, students should be able to encompass ideas from experiences, apply them, and finally create new ideas.

Salient favorites in learning. Beth grew up in a very structured environment where lecturing, listening, and reciting were the primarily methods for learning. She believed that she learned best when current knowledge was elaborated or challenged. She felt that she listened to lectures very well and was good at getting information from lectures and memorizing it. As a very organized learner, she liked teachers to make information available in small chunks and to present those chunks in a logical order:

> I'm actually a very organized learner and I grew up learning in a very structured, A, then B, then, C…recite and lecture and listen…and I still find that has a place.

Beth enjoyed trying something, getting feedback, and hearing new methods of learning. She was also comfortable and enjoyed working in groups. She believed that she was a good communicator and liked group dynamics.

Chapter Summary

This chapter presented the eleven participants' beliefs about teaching and learning in terms of comparability in belief with the expectation of student-centered learning environments and individual favorites in teaching and learning. As described in this chapter, each individual's beliefs about teaching and learning varied; however, for the purpose of this study, I examined individual's beliefs on a continuum where a reproductive belief was at one end and a constructivist belief was at the other end. Next chapter presents and discusses major themes and their relationships.

CHAPTER V

FINDINGS

This study explored students' beliefs about teaching and learning and their perceptions of student-centered learning environments. Eleven students shared their stories about the *Studio* courses, their beliefs about teaching and learning, and their perceptions of the *Studio*. The initial categories were recognized and refined through comparative methods among the participants based on open codes developed during the open coding procedure. The refined categories were used to generate predominant themes across the data. Several major themes emerged through comparisons among the participants. Based on the major themes, a few hypotheses were made regarding their relationships and tested across the data. Finally, relationships between the major themes emerged. The primary themes related to students' beliefs about teaching and learning are discussed in this chapter. Also, the students' perceptions of the *Studio* are presented, along with the relationships among the themes and students' reactions to the *Studio*.

Positioning the Self: Readiness for the *Studio Experience*

Positioning the self refers to students' self-awareness of the experiences they brought into the *Studio* courses. Beliefs about teaching and learning, prior knowledge and skills, and previous learning experiences are a few examples of self-positioning. Positioning the self indicated students' readiness for the *Studio Experience* and addressed the first research question regarding students' beliefs about teaching and learning. Readiness for the *Studio Experience* also included several other categories that influenced students' perceptions of the *Studio*, such as readiness for self-directed learning, motivation, and self-efficacy about technology.

Understanding the individual positioning was essential to exploring how each student's readiness was related to his or her learning experiences and perceptions of the *Studio* (Figure 11).

Positioning the Self: Readiness for the *Studio Experience*

Beliefs about teaching and learning
- Reproductive belief about teaching and learning
- Constructivist belief about teaching and learning
- Students as active participants
- Teachers as facilitators

Readiness for self-directed learning
- Previous learning experiences
- Perceptions of self-directed learning

Motivation
- Course expectations /interests
- Attitude toward learning

Self-efficacy about technology
- Previous experience using technology
- Self-assessment of technical knowledge and skills

Figure 11. Subcategories of positioning the self: Readiness for the *Studio Experience*.

Beliefs about Teaching and Learning

The participants expressed different and varied beliefs about teaching and learning. Beliefs about teaching, for example, included thinking of it simply as imparting knowledge, and skills, helping individuals become better people, and empowering students to contribute to society. Beliefs about learning also varied, from meaning the acquisition of knowledge to becoming a whole person. However, each student recognized the complexity of teaching and learning, overall. Also, beliefs about learning were closely related to beliefs about teaching. Tom, for example, believed that teaching is a process of imparting knowledge to students and that learning is gaining knowledge that is being taught. As discussed in the previous chapter, there are two broad categories of beliefs about teaching and learning: the reproductive belief and

the constructivist belief. However, all participants recognized the importance of the student' role in learning; they regarded students as active participants in learning and considered teachers to be guides and facilitators of their learning. Thus, four major subcategories were found in students' beliefs about teaching and learning: 1) reproductive beliefs about teaching and learning, 2) constructivist beliefs about teaching and learning, 3) students as active participants, and 4) teachers as guides for students' learning.

Reproductive belief about teaching and learning. The reproductive belief about teaching and learning category is related to teaching and learning as the transmission and acquisition of new information. The reproductive belief emphasizes the role of the teacher over that of students. Scott, for example, believed that learning is "to acquire knowledge or information and be able to retain that information and recall it whenever it is needed" and that the aim of teaching is to provide a lot of information. Brian also believed that teaching is a process of imparting knowledge and information, helping learners to grow and develop their expertise. Because they placed the focus on teachers rather than on students, it follows that student learning depends largely on how teachers organize and present information in ways that students can easily memorize, retain, and recall it later.

However, to some degree, participants with the reproductive belief tended to acknowledge the constructivist view of teaching and learning as well. While Brian's belief appeared to be well aligned to the reproductive view, he also embraced the constructivist belief about teaching and learning:

> Learning is the expansion of the knowledge, is partially retaining information, in fact, as well as skills, problem solving…it's a creative process to me, it can be as well….So, to me, learning, I think, kind of opens me up to new ways to solve problems, new ways to

> engage people, new ways to learn, new and better ways for me to absorb knowledge more effectively, and in turn, to be motivated and engaged.

Brian also shared his reproductive view of teaching:

> Teaching, to me, is both a process of imparting knowledge and information from a mentor to a student or a mentor to a mentee, or there are a number of different relationships between a teacher and a learner. But to me, I think it goes beyond that into…helping a learner grow, help a learner develop cognitively, intellectually.…So, I think there is a lot to teaching beyond just simply instruction and memorizing and retention of information.

Similarly, Tom regarded teaching as a process of imparting knowledge and skills. However, he also recognized the changes in his role to be a facilitator:

> Obviously, it [teaching] is imparting knowledge on others, but as things have changed recently, I'm in more of a facilitator role, it's more making opportunities for others to learn, so it is not like it used to be where you sit and get type of thing, where you are just doing the instruction.

Likewise, several participants who indicated the reproductive belief acknowledged the constructivist view of teaching and learning as well.

Constructivist belief about teaching and learning. The constructivist belief about teaching and learning mainly focuses on students' roles in the classroom. According to this belief, teachers should be on the side of students, providing guidance and support. A constructivist belief about teaching emphasizes that teaching intends to help students learn in their own ways, not the teachers' way. Thus, the participants with the constructivist view regarded teaching as guidance and support on the side rather than one-way reproductive

instruction from a teacher to students. The participants who subscribed to constructivism referred to teachers who guide students and provide support rather than imparting or transferring information and skills when describing effective teaching. Jennifer believed that teaching is helping students "become better people in every aspect of their life, as well as learn their academic subjects." Mary believed that teaching is helping students continue to learn for their whole lives. Teaching, for Julie, is learning, sharing, interacting, and exploring together:

> It [teaching] is not about filling people's heads with things; it's about learning together and empowering people to find what they want to do and what they're gifted at or can be gifted at. It's that exploration together.

The students with the constructivist belief acknowledged that learning is definitely more than acquiring knowledge and skills. They agreed that learning is, formally and informally, a lifelong process of gaining knowledge, integrating experiences, and becoming a whole person, while teaching facilitates the learning process. Thus, Emily talked about empowering students to be able to learn independently. Julie described the classroom as a co-learner environment:

> It [the student-centered learning environment] should be a co-learner environment for everyone. I think it is better for the professor if they are not there just to deliver like a vending machine their information. They are there to share and to interact, and so it becomes, and they end up learning as well. And it becomes an enriching experience for everyone. And so, it is necessarily student-centered in that way; everyone is the student and everyone is the teacher in some way.

Julie's perceptions about the student as a co-learner were consistent with the constructivist belief about focuses on learning in the classroom, and she regarded teaching mainly as facilitating student learning.

Students as active participants. Regardless of whether participants had the reproductive belief or the constructivist belief, all participants agreed on the importance of students' maintaining an active role in the teaching and learning process. These participants believed that students should take responsibility for their own learning. Students should be active participants rather than passive ones, and they should be willing to participate in classrooms. Thus, the participants thought that active participation, engagement, and motivation are keys to successful learning experiences. Julie gave her thoughts about the student's role as an active participant:

> The student role, I believe, is the most active one. The student needs to understand why they are there in a very real way—not "This is a credit that I need for my program," but "How does this enhance what I know? How do I use this in order to learn?" And it's very much their responsibility to make that happen. Hopefully, there is a professor that's talented at encouraging them and mentoring them, but it is their role to do it, to have that experience, and hopefully to share that experience with their classmates and their teachers. And I think when people have responsibility for their learning, it's a much better experience for everyone. It's not a passive thing at all.

Sara also emphasized the role of the student as an active participant:

> I think students have to take a lot of responsibility for their own learning. And I think the students' responsibility is to be active in that, not just accept what the teacher says or just do, but to actually to push back, to ask questions: "Why is that?" or "Is that really the best way?" "What happens if you were to do it this way or apply that process?" So, I think the student's primary responsibility is one to take responsibility for their own learning, so if they aren't getting it, it's the student's job to ask for help. If the student wants more, it

is the student's job to say, "Where can I learn more about this?" and to be actively engaged instead of sitting back.

Although Tom had a relatively strong reproductive belief about teaching and learning and believed that students learn what they are given by a teacher, his belief had changed to reflect more of students' responsibility in classrooms because of the recent emphasis on student-centered approaches during his teaching practice. Likewise, Susan felt that students in teacher-directed instruction were likely to be passive and thus were not likely to learn as much as they would in student-centered learning environments. She believed that students in student-centered learning environments tended to be active in the learning process, to be engaged and motivated, and to learn and retain more than those in teacher-directed instructional environments.

Teachers as facilitators. The participants described teachers as facilitators, helpers, and guides, challenging students and providing support for students' learning. Teachers should not take all of the responsibility for student learning, rather, they need to share the responsibility with students. Students should be responsible for actively searching for information and constructing understandings through their experiences, while teachers are responsible for facilitating student learning by being flexible and accommodating the diverse characteristics of students, motivating students to learn, and providing relevant resources. Therefore, the responsibility should be shared among all of the participants in a classroom.

Teachers, as facilitators, are still responsible for making sure that each student is learning and growing in his or her own way. Therefore, the participants believed that teachers should be flexible and accommodate students' diverse styles, personalities, and abilities. Sara believed that the teacher's role is to help students find their best way of learning. Each student has a different way of learning; therefore, teachers need to appreciate student differences and allow students to

learn in their own ways. Beth also recognized the importance of flexibility, stating that, "good teaching is being flexible and accommodating to students through styles, through the methods that you use in doing that."

Although students with the reproductive belief emphasized the role of the teacher as a facilitator, they still tended to think that effective delivery of information is one of the most important jobs of teachers as well. Scott, for example, stated that teachers should "provide knowledge or be a vehicle for knowledge." Beth believed that since teachers certainly knew more about their subjects, they were supposed to transfer knowledge to students. However, regardless of their beliefs, the participants did not appreciate teachers' one-way instruction. Instead, Julie described a teacher as a mentor, encouraging students to learn on their own and providing information and insights. Mary, a former teacher, described how she saw her role in the classroom:

> My role is not to get up there and lecture. My role is to show them how to learn the material themselves. I don't think that standing up there lecturing to them, they're going to get anything, and so if I can teach them how to learn it themselves…if they can find the material, know where to look, know how to search things on the Internet, know how to ask someone for help, that's what I'd like to do. Not standing up there just lecturing to them.

Tom also recognized the gradual change in his role as a teacher in his teaching practice. Instead of being the center of the learning environment, teachers need to step aside and facilitate students' learning on the side in the classroom. Therefore, the participants believed that although teachers' instruction is necessary to some degree, it should be used in a way to facilitate student independent learning. Teachers' instruction should help students to get started their learning and

remain as useful resources, not as a main focus. Then, teachers need to scaffold students' learning by challenging students' current knowledge and providing relevant resources for their learning.

Readiness for Self-Directed Learning

Only a few of the study's participants experienced student-directed, hands-on learning before entering the *Studio*. Julie had experienced service learning, which she believed was similar to the *Studio*, and Jennifer had taken several hands-on classes during her undergraduate education. Jennifer described her learning experiences:

> I had probably half of classes were really hands-on or we did a lot of group work and we did a lot of projects where I really felt like, we had to go find information and share it with each other and teach each other, and then I had the other half where we kind of sat in class and the teacher lectured and we just listened and took notes. So, those were my two different experiences.

Most of the participants had not had a self-directed learning experience prior to the *Studio*. Their previous learning experiences occurred mostly in traditional teacher-directed instructional environments, which involved listening to teachers, reading assigned textbooks and articles, doing assignments, and taking quizzes and tests. Julie shared her thoughts:

> We don't teach students to be life[-long] learners. They expected it to be, you just fill up my head and I spit it back at you, and I knew that wasn't what was going to really help me out of school because I'd already been out of school, I'd already been in the work environment, had a family, and I knew that none of that was going to be really helpful, but I needed something much more transformative than that to happen.

However, all of the participants believed themselves to be self-directed learners, even in spite of their lack of self-directed learning experiences. They were well aware of what the *Studio* expected them to do, and they hoped to be an active participant in the *Studio*. Julie recognized, after the first class meeting of the course, that students should be active members of the *Studio* learning community, helping and supporting each other to learn. Jennifer expected her role to be a designer of her learning experience:

> I think it is a designer and a co-designer because I think that as much as I'm going to be designing it myself, I'm going to be getting help from other people to help me make it better, and when I don't understand things, I'm going to ask questions.

Brian also believed that his role was "to participate actively, to help collaborate and work with other students where I might have knowledge that they can utilize." He added, "My role is to learn as much as I can from people who are more experienced in certain areas and methods and tools and to remain an enthusiastic participant."

Although all of the participants considered themselves to be self-directed learners, they expressed concern that others might not be ready for self-direction in learning. Julie said, "Students often resist becoming a self-directed learner because they are not used to it; it's not what they've been taught." The participants were worried that other students who were not accustomed to the *Studio* approach might feel confused and stressful. Sara considered the transition to self-directed learning as a maturing process:

> I don't think it is when students come out of undergraduate, they don't want to do that [self-directed learning]. It's that they haven't had many opportunities to really take responsibility for their own learning and do always know what that means. So, the older students, we all know adult learners are self-motivated, and certainly I've seen a number

> of older students from people in their twenties, certain those of us in our forties and fifties, really take a lot of responsibility for our own learning. Maybe it is a maturity process, too.

There is little difference in students' beliefs about their readiness of self-directed learning. Although few participants had had student-directed learning experiences, all of the participants believed themselves to be self-directed learners and knew what they were expected to do in the *Studio* courses.

Motivation

Many of the participants said that they had an intrinsic motivation to learn. The participants had high levels of interest in and expectations for the courses. Most participants were excited about learning computer tools that they wanted to master, making useful products for others as well as for themselves, developing their expertise in instructional design and computer tools, and working in a group. The participants in the beginning and the intermediate *Studio* courses were highly motivated to learn computer tools and to create something relevant to their work. Julie, for example, was very interested in creating distance learning courses and thus she was very motivated to learn the Web design and development tools. Susan, a special education teacher, had become interested in applying technology to help students with learning difficulties. Jennifer expressed her high expectation of this course:

> It is my first time to take the *Studio* and I want it [my project] to be a useable Website, and I want it to be something that my parents and my students can use when they are at home because it has been something that I've been wanting to do and I just haven't done it yet.

Tom was motivated to develop something useful to others, and he hoped to do this in his job in the near future:

> Being that we'll actually spend time developing something for someone that they can actually use, that's kind of exciting to me because that's what my job eventually will be, at least a facet of it will be to not necessarily constantly producing deliverables for teachers, but being an aide to teachers and putting together things for them to use in their classroom.

The students in the advanced course were excited to work in a group. Scott, for example, believed that he could benefit more from working with others and expected to get more out of teamwork in the advanced *Studio* course. However, Sara expressed her stress and anxiety about group work:

> I know we'll come out in the end with a really wonderful product that I'll be proud of, but right now my expectations pretty much are stress and anxiety. At this point, I don't have a lot of joy and excitement about what I'm going to learn because I feel like it is just something I'm going to have to plod through and get it done.

Overall, the participants showed high levels of interest in and expectations for the *Studio* courses. Most participants were excited about learning computer tools, and motivated to make useful products and to develop their expertise in instructional design.

Self-Efficacy about Technology

There was a big difference among the participants as far as previous experiences in technology and self-assessment of technical knowledge. Julie and Jennifer, for example, had not used the Web design and development tools, and they had difficulty understanding what the teacher was talking about during the tool workshops. Although Julie had been working with

computers for years, she was new to the Web design and development tools and she knew that it would be difficult for her to master them in such a short time:

> Yeah, just learning the new skill and not, it's been kind of difficult for me to like hit my stride learning the software because all the tutorials I try use vocabulary that I don't know. They refer to this and that and I need some sort of dictionary, "What are they talking about?"

Beth also felt that technology was an area of weakness for her and that it was out of her comfort zone. Although she was in the advanced course, she wanted to learn the tools in order to develop her expertise in them.

Mary, however, loved development and technology and believed that she had knowledge about computers and technology, stating, "I'm pretty good with software." Thus, even though she had never worked with Dreamweaver® or Fireworks® before, she believed that she could learn them during the semester. Katie also believed that she had "a natural aptitude to learn software," and she, as an advanced student, wanted to use her technical expertise in order to help those who would have difficulty learning the tools.

Scott and Brian had extensive computer-related experiences in their jobs. Although Brian had been a software engineer for years, he did not believe that he had a very strong technical background initially. However, as the semester went on, Brian realized that he did have knowledge and skills regarding technology:

> I found that I was actually further along than an awful lot were, and also my background as a Web developer kind of gave me a little bit of a leg up as far as being able to do work that a lot of the other students were struggling with skills learning, as far as being able to build Web pages and do design work with HTML. A lot of the students didn't even have

that knowledge, so at least I had a little bit of an advantage, I guess, that I knew some of those skills, although I'm not a web designer so a lot of that I had to learn. So, I was better off than I thought that I was.

Figure 12 presents a summary of students' readiness for the *Studio* courses. The participants acknowledged that teaching and learning was not limited to transmission and acquisition of knowledge. Other than the beliefs about teaching and learning, students' prior experiences in technology and their self-efficacy about technology were important to understand their perceptions of the *Studio* courses and their learning experiences in the courses.

Positioning the Self: Readiness for the *Studio Experience*

Beliefs about teaching and learning

- The participants with a constructivist view emphasized the integration and the application of knowledge and placed more focus on empowering students to learn in their own ways.
- Although the participants with the reproductive belief acknowledged the constructivist view of teaching and learning, they put a great emphasis on the transmission and the acquisition of knowledge and information.
- All the participants believed that students should be active participants in the learning community and that teachers should share their responsibility with the students and play the role as facilitator.
- However, there was no clearly different pattern of the students' beliefs according to different stages of the *Studio* courses. Rather, the belief about teaching and learning seemed to be formed individually.

Readiness for self-directed learning

- All of the participants believed that they were self-directed learners.
- They had a concern that others might have difficulty in self-directed learning.

Motivation

- The participants showed a high expectation of the *Studio* and were motivated to learn in the courses. The participants in the beginning *Studio* course showed the highest motivation in the course, while the students in the advanced course had mixed expectations of group work.

Self-efficacy about technology

- Some participants had a strong background of computer programs and tools and showed a high self-efficacy about technology, whereas other participants had little prior knowledge and skills in computer programs and showed a low self-efficacy about technology.
- Not all the participants in the intermediate and the advanced courses showed a high self-efficacy about technology.

Figure 12. Summary of readiness for the *Studio Experience*.

Perceptions of the *Studio Experience*

The participants agreed that the *Studio* was a new way of teaching and learning. Julie, for example, described the *Studio Experience* as a radical and innovative learning experience. Brian considered the *Studio* approach to be a very different model of teaching and learning that he had never before experienced. From the comparison across the data, six major categories of students' perceptions were identified and their relationships with the readiness for the *Studio Experience* were examined. These categories and relationships are described in the following section.

Student-Centeredness

Student-centeredness refers to the extent to which the participants perceived the *Studio* as a student-centered learning environment. This category includes appreciation of students' diverse characteristics, interactive communication styles, authentic projects, and alternative ways of assessment.

All of the participants regarded the *Studio* as a typical example of a constructivist, student-centered learning environment. Rather than focusing on teachers and teaching materials, the student-centered learning approach focuses on students' needs, interests, talents, and motivations that students bring into the classroom. Tom described a student-centered learning environment as a place where "students' talents and their weaknesses are the focal point of instruction and in learning." Therefore, student-centered learning environments are flexible, and thus can accommodate individuals' needs and interests. Sara commented on the advantage of the student-centered learning approach:

> I have a hard time with the technology; other people have a hard time with the design part. So with student-centered learning, I can get more help with the technology and someone else can get help with instructional design.

Teachers in student-centered learning environments acknowledge that students have individual purposes and needs and encourage students to interact with each others in ways that are meaningful to them.

The most important aspect of student-centered learning is the student in the learning process, not the information that the teacher conveys. Julie felt that while students are the object in teacher-directed instruction, students are the subjects in student-centered learning. Students can pursue what they are interested in, and because of that, student-centered learning can be more effective and efficient. Scott perceived the *Studio* approach to be more interactive, more engaging and, more student-focused. Students were engaged and motivated because they perceived the *Studio* to be a learning environment where they were able to pick up things in which they were interested and to create something meaningful. Students sometimes had flow experiences while working on their tasks. Mary, for example, described her learning experience in the following way:

> Once I sat down and start working with it, I like for it…you just don't want to stop. I just didn't want to stop. One time when I was creating the scallops, I couldn't figure out how to create the scallops that I wanted but…and then you just kind of lose track of time trying to figure it out and look at different things and I mean, I worked for a couple of hours before I even knew it.

Students were also motivated because they were actually making something for themselves or for others. Jennifer noted, "I want mine, when I get done, to be something that it looks like I spent as much time as I did."

The communication style in the *Studio* was considered different from the majority of course experiences due to the focus on student-centeredness. While the communication in

teacher-directed instruction is one-sided, with the teacher giving students information, the conversation in student-centered learning environments goes both ways. Students are expected to be engaged in a conversation, and they are supposed to be comfortable participating in the learning process. Katie described the communication styles in the *Studio* as "a conversation that everyone is participating in." Katie commented on the different communication styles in the *Studio*:

> There was some kind of instruction at the beginning and then we would meet, but we kind of left to create and make our sites and learn on our own and we had to seek a lot of the information our own. I mean, the resources were provided, but wasn't like "Do this reading." It was, "Here are some resources that might be useful to you."

Students in student-centered learning environments typically work on authentic projects. The authenticity of learning activities within the *Studio* increases as students move from the beginning course through the intermediate course, to the advanced course. Beth looked at the *Studio Experience* as an opportunity to apply the knowledge that she had gained. Although the group project experience in the advanced *Studio* course was not as fun as that in the beginning course, Katie believed that her group had an authentic project experience. Despite this experience, however, she noted that there were many items to hand in during the process, and she did not feel that she had control over the group process. Katie wanted to have more freedom to come up with ways of organizing and managing the project. Although the group work frustrated her, Katie admitted, "As much as I hate it, it just…it is more realistic." Katie added, "For this type of knowledge, it seems like the only way to really get a feel for what you're doing is to do it." She had this to say regarding her group work:

> I just feel like all the learning happened on our own when we were doing things with our groups and it was effective, and so I do think it's giving us a realistic situation or giving us a scenario where we have to accomplish something.

Susan, a student in the beginning course, was required to attend two team meetings of the advanced students. She described her observations:

> It was interesting just to watch them work together and to see how they were organizing their projects, and I like the way they're trying to replicate the same situation they'd be in if they were actually employed in that kind of situation and they work on a budget and they actually have a client. I mean, it's like something they do in the real world; that's what I like about it. It's practical.

Rather than using the traditional method of assessment such as tests and quizzes, the *Studio* adopted an alternative way of assessing students' learning. Students were required to show their mastery of the selected tools by completing individual and group projects. Instead of taking a final exam or handing in a final paper, students needed to present their project at a session called the Showcase at the end of the semester. Students actually liked the idea of the Showcase and wanted to have more people come to a larger place so that students could show off their projects at the end of the semester to a larger audience. Julie, for example, felt that the Showcase should be a little bigger and should bring more attention from a wider audience:

> I think that they could be even better, like I said, by really understanding how remarkable those projects are and how many people at the University don't have any idea what some of those products look like that are being turned out by the *Studio* students over there, and so sharing that a little bit more would be great.

Regardless of their beliefs about teaching and learning, the participants perceived the *Studio* to be a constructivist, student-centered learning environment. Due to student-centeredness of the *Studio*, students experienced a new way of teaching and learning, which they had never experienced.

Openness

The category of openness refers to students' perceived structure of the *Studio*. The participants concurred that the *Studio* courses were open-ended, as students had a high degree of flexibility in their tool learning and independent projects. Students were able to learn multimedia and authoring tools in which that they were interested. The *Studio* approach gave students freedom to choose what tools they wanted to focus on, how they wanted to learn, what they wanted to do for their projects, and what resources they wanted to use. Students were able to explore different options and different ways of learning on their own, which made learning more meaningful to each of the participants.

The participants in the beginning *Studio* course decided what to do for their individual projects; that is, topics for the individual project were determined based on students' interests and needs. Mary, for example, made a decision to create a Website of a cookbook, which related to one of her hobbies. Brian was interested in global warming and climate change and decided to make a Website about alternative energy. He gave his thoughts on the experience:

> This is a whole new way of learning and, certainly, of teaching, that I haven't experienced in any courses that I've taken before which have been much more structure: "Follow the syllabus. Here's what the project is," I mean, I've been given choice in projects I've done before, but never as much as total freedom both in terms of materials

> for learning what I need to do for my assignments and projects, as well as the project itself.

Students chose their projects based on their individual interests, and as a result, they were more motivated and engaged. They believed that they could retain more information from student-centered learning environments. Katie discussed this notion:

> Especially in 6190 [the beginning *Studio* course], students are more invested in their projects because they had that freedom to do whatever they want, and in 6190 they really stressed that you need to pick a project that you care about, and it makes a difference.

While getting an authentic experience, the participants in the intermediate and the advanced courses did not feel that they were given much freedom in terms of their individual and group projects. There was a lot of required documentation to submit during the project process. Oftentimes, Beth did not feel much freedom, as the course had many checkpoints, due dates, service hours, and other requirements. Katie described her experience:

> When I first took the 6190 [the beginning course], I just thought it was the coolest thing ever because I'd never had a class like that before, where it was very free and they said, "Here's what you can do," and especially because I like learning new technology so much, I thought, "This is awesome. I wish all my classes were like this because I'm really interested in this." It got less fun as you move on because there are a lot more requirements that you have to fulfill.

Students also had open-ended resources for their learning in the *Studio*. Students were able to figure out what they needed independently and to find their own resources. Due to the flexibility of resources, they were able to use their own resources to advance their understanding of their choices of tools. The *Studio* also provided a Website where students were able to access

other students' work from previous courses and see how they did the assignments. The *Studio* Website was useful for students to get initial ideas about the course, as well as to keep up with schedules, announcements, and reminders. Jennifer said, "When I do start designing it [my project], I know what I want it to look like because I've seen other people's and I've seen what I like and what I don't like." There was also a great deal of resources recommended and provided in the *Studio*, including wiki or Web collections of resources and learning materials for multimedia tools. Julie, for example, found the Website very useful because there were resources from the previous and current students, so that she had many examples to look at. Mary and Susan enjoyed the online tutorials for the tools that they decided to learn because they could return and watch the tutorials again if needed. However, due to the openness of resources, students, especially those with a low self-efficacy about technology, often found it difficult to determine which resources they should use and how they should use them.

One thing that was common among the *Studio* participants was that they did not rely as heavily on their instructors in the *Studio* as do students in teacher-directed classrooms. Brian stated, "Because of the looseness of the course, I didn't feel compelled to make him [the instructor] my first point of contact." Similarly, Mary did not go to the instructor to ask questions because she knew what was expected and where to find resources. She felt that there were a lot more resources provided in the *Studio*, and she was glad to be able to get some help from other students. Instead of asking the instructor, students in the *Studio* determined where to find the resources they needed to learn on their own. Brian, for example, looked at the previous projects to understand his assignments and to think about potential ideas for his individual project. He also used online Web resources, such as online courses for tool learning and online user groups. Brian described his use of resources in the course:

> I've been working with and asking questions of other people on the Internet user group, communications and discussion threads, and probably a little bit less learning through the on-campus lectures. So, it's been a lot more independent learning, which I like a lot better. So, I found it to be a really good self-motivating type of learning in the *Studio*, with less dependence on Dr. John on the class lectures.

Students' beliefs about teaching and learning seemed to influence how they perceived openness in the *Studio*. While students who held a reproductive belief perceived the *Studio* as being unstructured, those who had a constructivist belief about teaching and learning felt that the *Studio* courses were organized and structured well. Susan, for example, leaned toward the constructivist belief and thought that the *Studio* was very well structured.

> I think it [the *Studio*] is very well structured. I think…this class, in particular, has spent a lot of time planning and thinking about what they want the outcome of the class to be, what they want the students to learn and they give us a lot of choices, but they don't give you unlimited choices. They tell you what their expectations are, and I think that is structure.

Julie, like Susan, considered the *Studio* to be a very organized course. Julie wrote the following in her design journal:

> The other great thing was the effort that had been taken to keep us all informed of the requirements on track: the handbook, the calendar, the frequent messages on the listserv, and all the other resources including the listing and pics of classmates and professors, the wiki, tutorials, and WebCT. It's a lot of information but it's mostly well organized and quick to get to. These resources made me believe that I had a pretty good map to what was going on.

Brian, however, had a relatively strong reproductive belief, and he described the *Studio* as an unstructured and loosely designed course because the assignments were not clear and there were many different ways of tackling an assignment:

> There was loose curriculum in that we had to do a design journal entry, nine entries and then we had to do the volunteer and then we had to do the readings and so there was a little bit of structure but there really wasn't very much at all and even within those core assignments, there was a lot of freedom as to how you did it. There wasn't a lot of structure as how you were you supposed to do the design journal entry or the reading reviews.

Although Sara enjoyed the freedom to choose her own project that she was interested in as opposed to working on an assigned project, she felt that the *Studio* was too unstructured to support her learning. Likewise, Emily liked the fact that she was able to pick a project that she wanted to create, but she "would have enjoyed it more had it been mapped out" like teacher-directed instruction typically is. Emily had a great deal of freedom in the *Studio*, which she was not used to, and thus she was not comfortable in the course. Jennifer also felt that the *Studio* course was open-ended and abstract, which confused her. Due to the open-endedness of the course, Jennifer felt that there was an overwhelming amount of information to be learned in a limited time.

Direction

Direction refers to the extent to which students perceived control over their learning and their work. Due to the openness of the courses, the *Studio* left a lot of decisions to students, and students created their own learning experiences in the courses. Tom used the metaphor that students are "in the driver's seat" in the *Studio*. Therefore, the participants regarded the *Studio*

as a course requiring self-directed learning. That is, they perceived the *Studio* as a place where students took responsibility for their own learning, with the instructor serving as a facilitator. Susan mentioned, "In teacher-directed instruction, the teacher takes maybe not all the responsibility, but a majority of the responsibility, and in student-centered, the student takes responsibility for their own learning, with the instructor serving as a facilitator." Susan felt that the *Studio* approach was good for her and that she learned more by figuring things out on her own:

> I learn a lot more by just sitting down at the computer and trying to figure things out on my own than I do having somebody stand up and explain it to me or even a lot of times having somebody sit down and say, "Do this, do this" and I'll get up and I won't even remember it.

Because students had a great deal of control and ownership over their learning, they were responsible for identifying their needs and locating appropriate resources. Students' ownership of their own learning made them feel more active in the learning process. Brian said that the constructivist approach "forces me, as an adult learner, to find my own resource." He emphasized that students had to be self-directed, figuring out what to accomplish and how to accomplish it and managing their time to reach the goal. Brian described his approach to learning as "Web searches, Web research, tool research, tool learning independently, trial and error, making mistakes and correcting them, finding people and resources." Katie felt a greater responsibility in the *Studio*, and she believed that students played "a role in determining what goes on and what kind of information is learned in the class." Katie stated the following:

> I am a really self-directed learner and so I loved that semester that I took *Studio* because it was really like "this is what you need to accomplish by the end of the semester. Here are the things we have to help you. Go do your own thing" and I loved that.

Because the *Studio* was perceived as being open-ended, students felt that there was a large amount of responsibility and pressure on them. Students in the *Studio* tended to set high standards or expectations for their learning, although they negotiated it throughout the semester based on their capabilities, constraints, and other situations. Emily, for example, explained, "The only thing about the *Studio* that bothers me is that I never feel like I can get my project to the point I want it to be." During the semester, Susan was also worried that she could not accomplish as much as she would like to by the end of the semester. Brian felt disappointed because of the quality of his projects, saying, "It isn't going to be up to either the level or the standards that I, myself, would be happy with for the project." Emily described the pressure she felt:

> I still feel like, it seems like every semester in *Studio* I never feel like "Oh, I did something really great." I always feel like I could do more, I can do better and I always feel like I'm inhibited by the pure fact that there is so much more that you can do with these programs and I can't seem to get all of it that I want to be able to do.

Katie noted, "The expectations are higher, and so it forces you to work a little bit harder and it forces you to do class in a way that maybe you're not used to doing it, which can be a good thing."

While students took responsibility for their own learning, students perceived teachers as guides. Brian regarded teachers as guides on the side or the resources, while describing teachers in teacher-centered learning classrooms as ones "impart knowledge and then you write it down

and you studied, memorize it and you test on it or you build assignments based on that didactic information."

The participants expressed concerns that students were not used to the *Studio* approach and that they might not be prepared for self-direction in learning. Julie regarded the *Studio* as a better learning experience for students, but thought that students need to experience and appreciate the approach. Julie realized that the *Studio* course was challenging but rewarding to her:

> Students often resist becoming a self-directed learner because they are not used to it, it's not what they've been taught. But once you experience that, it's much more empowering when you're truly doing what it is that you need to do because you believe in it.

Although the *Studio* aimed at facilitating self-directed learning, some participants wanted to have a clearer direction for tasks. Some students in the beginning course did not completely understand the parameters for some assignments. Similarly, the intermediate and the advanced *Studio* students did not feel that they were provided with a clear explanation or rubric for the required documentation. Therefore, the students wanted to have a clearer direction for their learning in the courses. Tom, for example, still liked to have more direction, even though he did not mind the self-directed learning.

The *Studio* was actually designed to guide students to become more independent participants as the semester passed. Instead of putting students into self-directed learning from the beginning, the *Studio* fostered a smooth transition of students' dependency on teachers because they were not likely to be accustomed to self-direction in learning. Jennifer recognized that there was more teacher-directed instruction at the beginning of the course:

> So far it's really been a lot of teacher-directed but I think that as the semester moves on…it moves to more student-centered but as you move up in *Studio*, the third *Studio* is all student-centered and you just kind of lead your own project.

Most students, however, felt that there was a need to scaffold students' transition. Scaffolding at the beginning of the course could help students adjust themselves to the new approach and become more teacher-independent. Thus, Susan emphasized the importance of students' gradual transition:

> Students are taking on more responsibility for their learning than they used to. They probably start out being a little more dependent on the teacher and then gradually they become more independent and able to do things on their own.

Sara expressed thoughts similar to Susan about the importance of scaffolding:

> I suppose to build in some scaffolding maybe in the first or two weeks so that maybe it starts off a bit teacher centered and becomes more student centered and sort of eased into it with a lot of support.

Students who held a reproductive belief about teaching and learning and a low self-efficacy about technology wanted to have more teacher direction in the *Studio*. Beth, for example, said, "I just felt like they were like, 'Here's the book, good luck,' and it's just that didn't work for me." She further stated, "I could explore more because I do feel capable that I could learn these different tools [in teacher-directed instruction]." She needed some direction at least at the beginning, stating, "Sometimes directed, 'here's some basic facts' needs to happen before you can emerge into discovery and student centered." Likewise, while Sara appreciated the freedom to explore things in ways that were meaningful to her in the course, she also felt that she needed more direction, at least in the beginning course, even if it diminished her control over

her learning. Sara had a concern that young students might have difficulty learning in the *Studio*, and she recognized the importance of appropriate support:

> If they don't know themselves well enough and don't have the confidence and don't understand what they need to know, then they flounder in a student-centered environment and I guess where scaffolding comes in.

Support/Guidance

Support and guidance refers to the students' perceived degree of the interaction between students and teachers. Coaching, supporting, and guiding students' learning are critical in every educational setting. However, especially in student-centered learning environments, scaffolding students' learning is even more critical, as students expect to get more support and guidance, rather than detailed information, from teachers. They expect to have constant and continual interaction with and to get more input from instructors.

Students in the *Studio* were required to take responsibility for their own learning. However, this did not mean that teachers played a minimal role in the classrooms. Rather, in this student-centered learning environment, the focus of teachers was not on delivering information, but on supporting and guiding students' learning as needed. The participants believed that teachers should pay attention to individuals' needs, interests, and skills and be available for help. Teachers should be willing to sit down and talk with individual students and should have the flexibility to tailor the course to students' needs, interests, knowledge, and skills. Due to the diverse characteristics of students, teachers should provide different levels of support and guidance. That is, tailoring support to individual needs is a key to scaffolding in student-centered learning environments.

The participants' perceptions of the level of support in the *Studio* varied according to their prior skills and knowledge about multimedia and authoring tools and instructional design. The participants felt that technology skills and self-directed learning skills were critical for success in the *Studio*. Scott noted, "If you have got a good solid background, I think it's okay, but if you didn't have a good solid technical background, you're going to be struggling." While the participants who had previous skills and knowledge felt that the *Studio* courses were very supportive to their learning, those who had little background in the tools complained about the lack of support in the *Studio*. Katie, for example, was good at learning computer tools on her own and enjoyed self-directed learning. She had never felt stranded because she felt that the teachers were easily accessible:

> I think my first semester experience was much more true to what I envisioned as a successful student centered learning experience where I had ample time to do things on my own but I also felt support from my professor and from the other students around me.

Tom also felt that the instructors were available for students and that they were very accessible throughout the semester. Due to his job, Scott had "a little more knowledge of technology" and felt that there were enough workshops and support for students to get started with the computer tools.

> What I liked about the *Studio* environment is that it gives you enough of a head start or a little bit of instruction up front and you're allowed to kind of hit the ground running and kind of learn as you go, kind of building something or creating projects and so you learn as you go and you construct something and construct learning in the process.

Scott mentioned, "I've got a fairly good background in technology and certain things come pretty easy for me in terms of learning software and how to use software." He also felt that there were enough resources provided in the *Studio*.

The participants with little background in the tools, however, felt a lack of support and guidance in the *Studio*. Jennifer, for example, did not think that she "was ever really guided" in the course. Although Scott found that the *Studio* courses provided support and resources for students, he stated, "If you don't have a real strong technical background, then I think it could be more difficulty to be successful in the class." Likewise, Katie admitted that she would not like the student-centered approach without prior knowledge. Therefore, lack of support and scaffolding emerged as a big issue for the participants. Julie felt that the *Studio* approach would work for more advanced students better than for beginning students:

> I thought to myself a couple of times, "Okay, where is my scaffolding?" I'm not feeling the scaffolding here, as I sit alone pouring over the books and listening to tutorials. Though, I know that at any time, I could email any of the professors or my classmates for that matter and ask a question. The problem with that is that you have to know what your question is and a lot of times it's not clear in your mind what the question is.

The issue of the lack of support was also raised among the advanced students with limited knowledge and skills of the tools. Although Beth was very secure in her abilities in self-directed learning, she felt that she did not get a lot of support and guidance in the *Studio*. Because she did not have a strong background in multimedia tools, she felt that the *Studio* did not provide tailored guidance to individual needs and abilities. Beth stated, "It doesn't seem fair that you start at the level of the people who have background knowledge." She thought that the

course "doesn't hurt people who already know more about the tools and technology," but she realized that she did not have a basic foundation to get started in the *Studio*:

> I feel very strong about my ability to direct myself but when it comes to technology and the kinds of things that are addressed in *Studio*, I don't feel that I'm very comfortable with my ability to direct it because I don't know where to start.

Beth felt that there should be more direct instruction of tools in the beginning *Studio* course. She felt that she could have explored more and learned multimedia tools better if she had been taught using traditional approaches to teaching the tools. Beth described the changes of her perception of support throughout the *Studio Experience* as she moved to the advanced course of which the focus was not on learning a tool:

> In 6190 [the beginning *Studio* course], I felt like it needed to be more hands-on and by 6210 [the advanced *Studio* course] I was like "leave me alone"… I mean, I thought that they could leave me alone a little bit more because I know what I'm doing by the third installment, you know.... I'm like, "Help me, help me, help me" and then by the third course, I was kind of like, "Could we please just get on with it?"

Although a series of workshops on the selected tools were provided at the beginning of the course, the participants with no prior skills and knowledge felt that the workshops did not cover much information due to the limited time. Susan felt that it would have been very helpful if there had been more time to cover more information on the tools. She actually liked the *Studio* approach, but there were often times when she felt that she would "like to have somebody just sit down and explain something to me or just go through it step by step for the whole group." Susan wished to have a little more support for her learning. Similarly, Jennifer felt that the workshops did not cover enough and felt like a lot was left out. She wished to have more workshops so that

she could have had more knowledge and skills for her learning and independent project. Sara was new to multimedia tools and Web design and needed more support and guidance for her tool learning. She wished to have more faculty engagement with students' work and to get more input from the teachers:

> I, frankly, don't see the work in it for the faculty. I know there is some work but it just seems to me that they could be much more involved and much more hands on, not as the authority figure, as the teacher, but it is one more set of eyes.

Emily had no prior knowledge or skills of the multimedia tools, and she was overwhelmed by the independent project, as well as individual tool learning. She felt that she should have learned how to use the tools prior to the *Studio*, as she felt that the course did not intend to teach the tools:

> I think had I known the programs a little bit better, it would have been really fun, I would have just gotten carried away with it but because I was struggling to both learn the programs and create the project, it got me a little bit stressed.

Also, the participants with little background of instructional design felt frustrated by the lack of support and guidance. Because Brian was new to instructional design, he had little prior knowledge about it and he wanted to have support for his independent project. However, Brian felt scared of the learning process because he did not get as much guidance and support as he needed. He felt that the *Studio* was not as supportive as it could have been. Brian suggested that there should be more support and guidance, especially early on in the course:

> I think there has to be a lot of, especially early on in that process, a lot of maybe monitoring from the instructor or from the mentor if there is a co-teacher or an assistant teacher or a lab assistant or whoever you work with in the structure of the course…to

kind of…maybe check in, kind of almost like a check up, like, "How are things going? Where are you struggling?"

Students with low self-efficacy about technology sometimes felt that they did not get anything done, even though they worked hard. Scott mentioned, "Sometimes you could feel like you're just spinning your wheels and not really getting anything done." Thus, these students wanted to have a mentor to whom they could directly go and ask for help as needed. Julie, for example, wished to have more mentorship, as she felt that her work was more independent than she would like it to be. Likewise, Mary mentioned, "I don't really want someone where I had to come in and meet with all of the time, but I wanted someone that I could ask questions to."

The participants did not find feedback from the instructors to be helpful. The participants felt that the instructors should have provided more insight on how to improve their learning and their projects instead of checking whether the students accomplished the requirements. Sara, for example, felt frustrated with the lack of assessment and formal feedback from the instructors, stating, "Part of assessment is for the grade, but for me, assessment is feedback on how I am doing and what I can do better."

A Sense of Community—Interaction/Collaboration

The sense of community category refers to the students' perceived degree of interaction and collaboration among students. Students perceived a student-centered learning environment as a place where they could have more opportunities for interaction and collaboration with others and for the development of a learning community. Students recognized the importance of learning community at the beginning of the courses and expected to have significant interaction with other *Studio* students. Brian, for example, stated, "I think it is a very effective thing to teach students that skill of being able to work collaboratively, to work in a team, to communicate, to

support each other and help motivate each other." Julie believed that because there was a lot of diversity among the students, they would get even bigger benefits from interaction and collaboration with others. Julie also recognized the importance of the learning community. She believed that individuals are not independent of one another and that creating a secure and comfortable learning environment is essential, especially in courses like the *Studio*:

> The more you feel part of that learning community, the more you can take advantage of the resources which mainly consist of the individuals in that community and what they have to share. The more you take advantage of it, the better it is.

The *Studio* was intended to build a learning community by encouraging interaction among the participants. First, there were a few *Studio* briefing sessions where all the *Studio* participants from the three courses attended and shared their experiences, including the first and the last meetings of the semester. Second, the beginning *Studio* students were expected to attend at least two group meetings of the advanced students. Third, the intermediate students were expected to contribute their expertise to advanced students' group work. Fourth, the advanced students were expected to provide mentorship to beginning. Additionally, there were a few incidents where students got together to develop a learning community, such as a bowling night.

Despite these attempts, only a few participants appreciated the efforts of the *Studio* to create a learning community. Scott recognized that the *Studio* was "a partnership of a lot of different people to learn instructional design," and he believed this was the best thing about the *Studio*. Mary learned a lot from collaborative work with students in the intermediate and the advanced courses, as well as from her independent work. She felt that the *Studio* provided collaborative resources that she could use. Initially, she did not understand why the three *Studio* courses were in the same classroom. However, Mary came to like the idea of having the three

Studio courses working together because she was able to see where she was headed and what she would be expected to do in the more advanced courses:

> I didn't really understand like, "Why are we all in here together? This is a really big class" but then, after a couple of sessions and seeing how it was broke down, I was finally able to see that they were there to show us, kind of guide us also, so after a couple of sessions I was able to see why it was laid out the way it was and it was helpful.

Many participants, however, felt the lack of interaction among students. The beginning *Studio* students, in particular, did not see much interaction in the course. The students did not have enough time to communicate with each other; as a result, it was common to feel alone and isolated. Julie, for example, did not have a chance to really talk to her classmates until the midpoint of the semester:

> The first half of the semester has been learning the tools so I'm thinking the second half of the semester will be less consumed with the tutorials and Dr. John lecturing to us about whatever, that we will have a little bit more time to communicate with each other.

Similarly, Brian was not happy with the amount of interaction he had with peers. Brian often felt alone and frustrated because he entered the course with clear expectations: "more interaction with other people in the class particularly this class and there hasn't been really any of that to any huge degree." He stated, "I was kind of very much on an island." Due to a lack of opportunities, students, especially those with introverted personalities, had difficulty interacting with others and being comfortable with them, which influenced their adaptability to the *Studio*. Emily described her opinion on this topic:

> I think if you're a shy person, I think this could be a really tough learning environment because I think I can be a little bit shy sometimes and you just can't shy, you've got to

> open up and you've got to want to get out there and get that information because if you don't, you're not going to get as much as you can out of a program like this.

Although Emily felt that there were many good interactions and she felt a need to interact with people to ask for help, she did not feel that she always had a chance to actually have those interactions.

The group work produced in the advanced course was highly respected by the participants in the other *Studio* courses. However, the participants in the advanced course did not enjoy working in their groups. Although students completed their projects on time and they were satisfied with their quality of work, they were not fully satisfied with the collaboration process. Sara, for example, had issues with leadership and group dynamics. Although she was a project manager, she did not have any authority to improve the quality of the group members and to foster the formation of a cohesive team. Sara identified the lack of collaborative learning as one of the weaknesses of the *Studio* as a whole. She remembered, "I don't see a lot of opportunity for the collaborative learning that is supposed to be supported by *Studio*."

Due to the lack of interaction, students did not know where to ask for help, and thus finding proper resources on their own was time-consuming and frustrating. Susan believed that the *Studio* approach matched her learning style well and felt that the *Studio* provided enough resources for her learning at the beginning of the semester. However, she found it stressful to figure out everything on her own at the midpoint of the semester:

> It's been a little stressful for me to have to learn so much on my own, I think. I felt better last night because we had a project session where we just came in and worked on projects and the 6210 [the advanced course] students helped us and the two of them actually just sat down with me and went through things step by step and showed me how to do certain

> things that I didn't know anything about so that was, you know, really helpful. I was glad that I got a little bit of one on one instruction because I didn't know anything, you know, about Dreamweaver® or Fireworks® or anything like that before.

As Susan mentioned, the participants found the Project Day to be helpful and a good way to develop a sense of having a learning community. There were two Project Days in the semester; on these days, all of the advanced students were paired up with the beginning students and provided support and resources for them. While the advanced students enjoyed helping others, the beginning students had a valuable opportunity to ask for help from the advanced students. Brian really appreciated the sessions and enjoyed the open and free exchange. Likewise, Susan learned a lot from the Project Days and felt that the students in the *Studio* were all supportive of each other and willing to help each other:

> I've really gotten the most out of these projects nights when we can work with other students, when we interact with other students and especially students that are more proficient than we are, more experienced. I think that would be good, if we had more opportunities especially to work with the 6200 [the intermediate] and the 6210 [the advanced] students. Or even if we had more opportunities to work with each other in 6190 [the beginning course] because we really haven't had a lot of opportunities to interact with each other even in that class.

The participants felt that students in the *Studio* were actually willing to help each other and that they were able to share positive feedback and openness, which gave students more confidence and made them feel more comfortable. Once students got a chance to interact with each other, they really appreciated the interaction and found it very helpful. Brian, for example, was "closing to dropping the course" because he felt that he was behind in terms of his tool learning

and independent project. He offered this reflection: "It helped to talk to some other students who were struggling as well. That gave me a really good level of confidence that I wasn't alone." Julie also felt a sense of learning community and shared her experience:

> The minute I spoke up and asked for help, it was obviously, that "Oh, let me help", it wasn't like "Oh, what's the matter with you?", no, it was an entirely different attitude and as a matter of fact, I learned that if I knew something that they didn't know, they told me, "Oh, I didn't know that would do that" and so we were all just playing with it together and everybody was happy to learn something new.

Students expressed desires to have more opportunities for coming together and helping each other from the beginning of the courses in order to establish rapport with other students in the *Studio*. Jennifer, for example, suggested that the *Studio* provide a "get to know you" session at the beginning because "it kind of makes you get out of your comfort zone, but at the same time it makes a connection between you and the people that you're going to be with." Brian suggested that even the beginning course should provide an opportunity for students to work in groups of two or three other students to support each other. Julie also wanted to see group work in the beginning course:

> I understand in 6190 [the beginning course] there is an advantage of individual projects but in some respects it would almost be better if the 6190's could be working on something together, even it wasn't perhaps something that they were going to present to a client.

While the Project Day was appreciated by the participants, they did not find the whole *Studio* briefing sessions helpful. The students in the advanced course, particularly, felt that their

time was not respected. Katie did not feel like "anybody got anything out of those [whole *Studio*] meetings." She commented about the briefing sessions:

> I think that kind of community is going to be fostered more by having those [project] nights where we sit and help each other rather than all sitting in the same room listening to announcements that they could have emailed us.

Some students did not appreciate having to sit with students from the other courses and listen to the announcements that did not apply to them. The beginning students, in particular, tended to sit back because there were more advanced students in the classroom. Julie offered these thoughts:

> It is great and it's wonderful that we meet with the other two classes, the other groups but that complicates matters for when we're all together it can be difficult for everybody to ask the questions that they want to ask and if we forget about them and get busy with the other things, it just flies out of your mind and you don't have an opportunity to ask.

Aside from the Project Day, there were two main things that the participants liked for developing a sense of learning community: the design reflection journal and the peer critique. Students found the design reflective journal very useful. Brian described his feelings about it:

> It [design journal] was very therapeutical...it was a tremendously valuable part of the whole experience for me, the design journal. I would love to do it for almost every course now. I know that I probably won't but I found it very valuable experience.

The design reflection journal was helpful for communicating with the instructors, other students, and group members, as well as for keeping individuals on task. Katie described her use of the design journal:

> I think if we were frustrated about something in our team, before I would write my team 15-5 [design journal], I would always go and read all the other people who were on my team so I get a sense of what everybody else was feeling because I felt like I was supposed to be writing for the team, not just for myself. And when people were frustrated with what happened in class or whatever, they wrote about it and I mean, they were pretty honest in their 15-5's and so I think it's a good tool to communicate with the instructor without having to send an email without having to be stressed about it.

Additionally, Susan found the peer critique helpful for making connections to others and for improving her project as well.

Comfort and Confidence

Comfort and confidence refers to the students' perceived levels of comfort and confidence. Creating a comfortable learning environment is essential and critical for students' learning. Julie believed that a student-centered learning environment should create a comfortable atmosphere "where we can question what we're learning, question what we think we understand about what we're learning, and discuss it together."

The *Studio* approach was unique and new. The new approach of the *Studio* initially caused students to have uncomfortable feelings. All of the participants had a concern that the *Studio* approach might be stressful for those who were not accustomed to the new approach. Because students had not had an opportunity for self-directed learning, they were not used to managing their own learning. Also, there was a concern that students might not be able to enjoy their independent learning and that they might be intimidated by having so much freedom and authority over their learning. Therefore, it is foreseeable that students may not have confidence in learning in the *Studio* and may feel uncomfortable.

The perception of open-endedness influenced the level of comfort. Brian, for example, had a relatively strong reproductive belief about teaching and learning at the beginning of the semester. He had enjoyed structured courses and gave an example of structured courses using his previous math course, noting, "It's very comfortable because you know exactly what you have to do and you gauge your time." Initially, Brian perceived the *Studio* as an unstructured course:

> I'm trying to start to get the ball rolling but I kind of still feel like I haven't done everything that I need to do in this week's time. So, there is definitely a lot of fear on my part that I'm not moving forward as well as I need to. There aren't a lot of road signs or definitive mile posts like, "Have you done this, this week? Have you done this? Have you done this?" They leave a lot up to the individual learner or student.

Along with the perception of openness, self-efficacy about technology and prior experience also influenced students' levels of comfort. Usually, even in teacher-directed classrooms, putting students in new environments makes them uncomfortable, at least at the beginning. They soon become comfortable when they follow the teacher's instruction. However, students in the *Studio* were supposed to learn computer tools individually, so self-efficacy about technology influenced how soon students became comfortable in the *Studio*. The participants with prior knowledge and skills in computer tools or a high self-efficacy about technology were able to adopt themselves to the new learning environment more easily. Due to prior knowledge and skills in technology, Scott felt confident and comfortable in the course. Katie also had a prior background of computer tools, and she was very comfortable with working with the tools:

> I think that I have a natural aptitude to learn software and so I think I didn't feel the frustration that a lot of people felt in my class because I felt really confident that I would be able to handle it.

Although Mary had not learned the multimedia tools, she had a high self-efficacy about technology because she had experienced different computer applications:

> It would have been a lot more intimidating if I'd come in here and had no experience at all. I had the background in business so I knew how to manage different projects. It probably would have been a little more overwhelming if I didn't have that background.

However, for those with little background of computer tools, the *Studio* approach was intimidating, as they did not have confidence in learning technology and felt uncomfortable. Katie recognized the importance of a sense of confidence and comfort in learning in the *Studio*:

> I think if it was a different subject matter, I might be more hesitant to be in that kind of situation but because it's technology, I'm very confident because I feel like I have natural abilities in that area. If it was statistics, I would not be okay with student centered learning approach. I would want someone to explain things to me in detail constantly. And so because it's an area that I feel like it's a strength for me, I'm very comfortable, very confident.

The confidence in learning technologies and feelings of comfort seemed to be related to each other. If students were not confident in learning computer tools without step-by-step instruction and mentoring, they seemed to be uncomfortable because they felt that they may not be able to succeed in the course. Beth, for example, had a very frustrating and uncomfortable learning experience in the beginning *Studio* course because she did not have a strong background in the computer tools. Since technology was an area of weakness for her, she felt that the course was

out of her comfort zone. Beth said that the beginning course "wasn't necessarily a bad experience, but it wasn't an ideal good experience and I wished that course was different. I didn't learn as much as I wanted to learn, and I still feel like I struggle with [the computer tools]."

Although Emily enjoyed the *Studio* and felt good about the approach, she felt uncomfortable in the beginning *Studio* course, as it was new to her and it was difficult to get to know people in the class. She was not used to having a lot of freedom in classrooms and was concerned that uncomfortable feelings might hinder her learning in the *Studio*. She was also overwhelmed by information and felt frustrated and stressed. She mentioned that she would have learned more and enjoyed more with prior knowledge of computer tools. She noted that she would like to have a course for teaching computer tools in a step-by-step manner:

> I felt more frustration in that [beginning] class though because I felt overwhelmed. I was trying to learn the programs because I didn't know Flash®, I didn't know Dreamweaver® plus I was supposed to make a project. So for me, I would have rather had a course that said, "We're going to learn these programs. Here's how to learn it" and go through structurally and learn the program and then maybe had a course where I actually created my project. So, I think had I known the programs a little bit better, it would have been really fun, I would have just gotten carried away with it but because I was struggling to both learn the programs and create the project, it got me a little bit stressed.

Similarly, Julie did not know how the Web worked and had little knowledge of the computer tools. She was intimidated and frustrated because she needed to complete an independent project as well as learn the software programs in a limited time. Sara also felt insecure, as she did not grow up with technology and thus expected more structured instruction. Brian felt that

traditional teacher-directed courses would be a much more comfortable environment for him to learn instructional design.

Jennifer identified discomfort as one of the biggest concerns in the *Studio*. Jennifer was used to being told what to do and felt comfortable in teacher-directed instructional environments. However, she felt uncomfortable when she did not know what to do; thus, while she believed that students in student-centered learning environments can lead their learning and guide where they want to go, making learning outcomes last longer, Jennifer said that the *Studio* course atmosphere made her very uncomfortable as a learner because she felt that her learning was not guided or supported:

> We're so used to being told exactly what to do and so it's uncomfortable in the beginning and until you're used to that. You're very uncomfortable. And so, as a student, I don't like it [the *Studio* course]. It's an uncomfortable feeling. But I do see the good in it and I think that the more comfortable that you become with the people with you, the people that you're working with, the easier it is to say, "I don't know what to do" but when you're put in a new situation with new people that you don't know, and then you're kind of left, then it is very uncomfortable because you feel uncomfortable saying, "I have no idea what they want me to do and I don't know your name and you don't know mine", then you're very uncomfortable because it is like you feel all alone.

The feeling of being alone could be lessened with more opportunities of interaction. However, as described earlier, the participants did not have much interaction with others, and it was difficult to get to know people in the courses. Also, the *Studio* students did not feel that they received enough support from the instructors. The lack of support and interaction made students feel uncomfortable, especially in the beginning course. Beth often felt "like an island" and she

believed "self-directed learning doesn't have to be self-directed alone." Due to the lack of opportunities for interaction, Emily was uncomfortable:

> I really feel, for me, the uncomfortableness of is probably what would hinder my learning in the *Studio* because I don't feel comfortable and if you don't feel comfortable, sometimes you don't get to learn as much.

Students' discomfort with the new approach tended to decrease with time. For example, Beth felt that she was "way out of my league" when she first entered the course. However, she became more comfortable after a few weeks in the *Studio*. For those who had little prior knowledge and skills, providing necessary support and more opportunities for interaction would increase their level of comfort. Students were likely to become comfortable with timely support and interaction with others as they increased their knowledge and skills needed in the *Studio*. When they felt that they were in their comfort zone, they were likely to be more active and to actively ask for help. The increased comfort level of learning in the *Studio* helped students to build confidence in their learning in other student-centered approaches.

Students' Reactions to the *Studio Experience*

This study also examined whether students changed their beliefs about teaching and learning after having the *Studio Experience*. There were six categories of students' reactions to the *Studio*: match, confirmation, conflict, withdrawal, appreciation, and transformation. One thing to consider was that students did not stay in their initial categories; they changed their initial reactions throughout the semester according to their learning experiences. This section presents the six categories of the students' reactions to the *Studio Experience*.

Match

Match refers to students' initial perceptions of congruence between their beliefs about teaching and learning and the expectations of the *Studio* at the beginning of the semester. After being introduced to the *Studio* approach, the participants with the constructivist beliefs about teaching and learning felt that the *Studio* approach matched their beliefs and philosophies. The strong case was Julie, who was a proponent of the service learning model. Julie believed that teaching empowers people to find their own ways of learning. She also believed that learning means integration of knowledge through experiences. When she entered the course, she expected to sit down in front of a computer and be taught how to use computer programs. However, after a few weeks, she realized that the *Studio* was an entirely different course. She stated, "It [the *Studio*] was perfect for me because that's what I was learning." Since she thought that the *Studio* approach fit with the service learning model, she believed that the *Studio* would perfectly match her beliefs about teaching and learning. Julie believed that the *Studio* approach was "a far superior way to learn." Another example was Jennifer, who liked the *Studio* approach at the beginning of the semester. She believed that she would enjoy learning in the *Studio* because she would be able to guide the direction of her own learning. She emphasized a student's active role and a teacher's role as a facilitator in the learning process.

However, not all the participants who believed that the *Studio* matched their beliefs about teaching and learning did enjoy their learning in the courses. There were primarily three different reactions to the courses as the students went through the semester: confirmation, conflict, and withdrawal. These different reactions seemed to stem from students' self-efficacy about technology and their perceptions about the *Studio*. The participants with a strong background in technology had high self-efficacy about technology and enjoyed the freedom

offered in the *Studio*, while those who had little prior knowledge experienced a conflict, fearing that their constructivist beliefs might not be an effective way of learning computer tools. Although both Julie and Jennifer believed that the *Studio* fit well with their beliefs and philosophies, they reacted to the *Studio* in different ways (Figure 13).

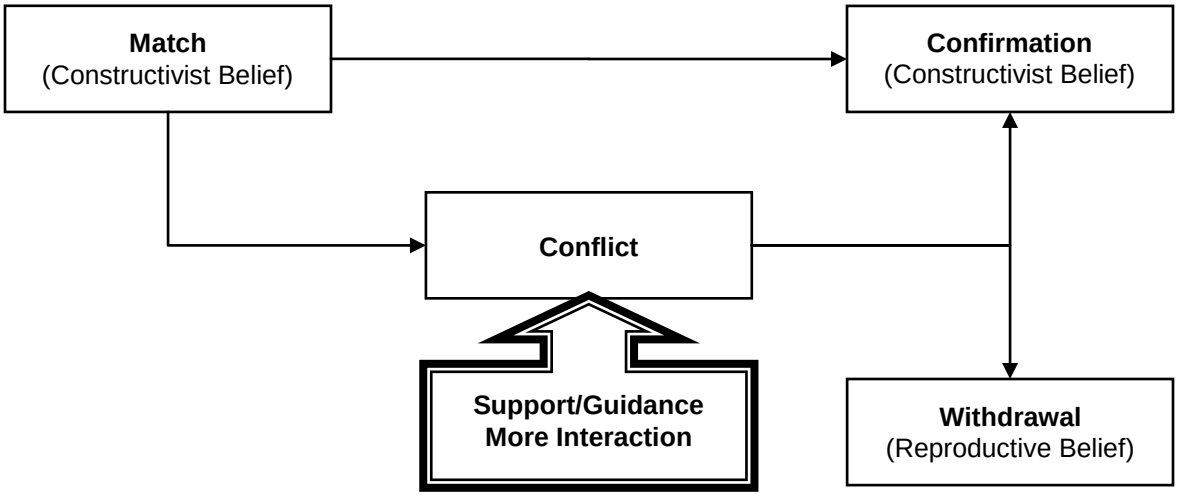


Figure 13. Reactions of students with constructivist beliefs to the *Studio.*

Conflict

Conflict refers to the differences between students' initial beliefs about teaching and learning and their assumptions about teaching and learning in the *Studio*. The reproductive beliefs about teaching and learning that some participants held conflicted with the assumptions and expectations of the student-centered learning environment. Although Emily enjoyed learning in the *Studio*, she liked teacher-led instruction. She believed that teachers should set and present clear objectives and expectations and present information in a structured way so that students can learn more easily. Instead of learning by designing, Emily would have preferred a lecture-style course to learn Flash® and Dreamweaver®, believing that she could learn the

programs better in a teacher-led class. She noted that she would have liked to have had knowledge and skills of the tools prior to the *Studio* so that she could apply them to create a more elaborate project in the *Studio*:

> I would like there to be a class where you could just sit down within this program and they actually just teach me the program instead of "We'll teach this part and this other part." I want to know all of it and not that I can know all of it but I wanted to have a major handling on these programs before I'm responsible to work with a client and create something because I want to feel like my work is top, instead of "Well, that's what I can do right now. Here's what I can create for you." I want to feel like I have more skills.

Both the reproductive belief students and the constructivist belief students expressed conflict in their beliefs. This particularly occurred with those students having little skills and knowledge of the computer tools; these students reported having a hard time learning the tools independently and wanting more direction and support for their learning. They realized that their beliefs about teaching and learning might not be valid in reality. Julie, for example, with little prior knowledge, was intimidated by overwhelming information and complained about the lack of support and the lack of interaction with others. Susan initially felt that the *Studio* approach suited her learning style and beliefs, but later she expressed that "more of us are needing an instructor to stand in front of the class and explain things" during the semester.

All the participants who experienced the conflict, however, did not have a negative perception of the *Studio* courses. There were primarily three different reactions to the courses: confirmation, appreciation, and transformation. These different reactions reflected participants' self-efficacy about technology and their perceived degree of support and guidance during the semester. The participants with strong backgrounds in technology had high self-efficacy about

technology, and they were able to learn the tools independently and appreciate the new approach. Some of them even changed their beliefs to reflect more constructivist, student-centered beliefs. However, others confirmed their beliefs that they would learn better in a traditional teacher-led classroom. Figure 14 represents the reactions of students with the reproductive beliefs to the *Studio*.

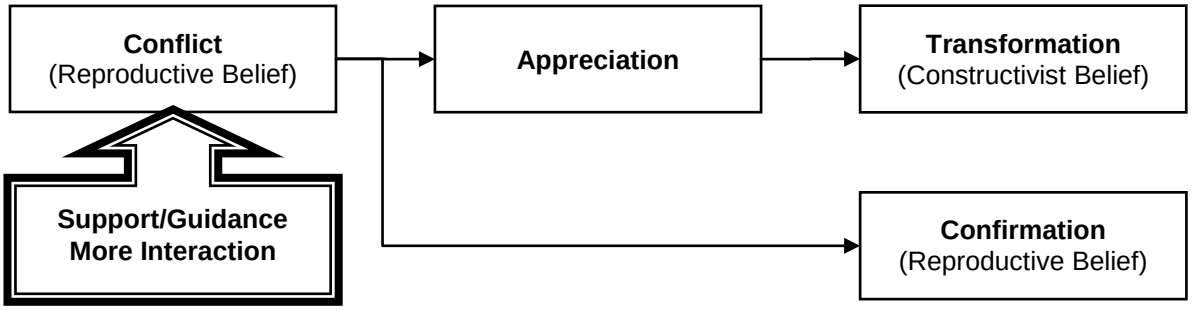


Figure 14. Reactions of students with reproductive beliefs to the *Studio*.

Confirmation

Confirmation refers to students' affirmation that their initial beliefs about teaching and learning are valid. There were two dimensions of confirmation. First, the participants with the constructivist beliefs confirmed that their constructivist beliefs were effective. The participants with a solid background of technology, in particular, enjoyed the freedom and the self-directed learning offered by the *Studio*. Mary, for example, had a relatively strong constructivist belief about teaching and learning. Although Mary had not previously experienced student-centered learning, she believed that student-centered learning approaches could engage students more and make learning outcomes last longer. She felt that the *Studio Experience* gave her a better understanding of what student-centered learning was, and she came to confirm her belief regarding teaching, learning, and the student-centered learning approaches. Mary said, "I

understand it [the student-centered learning approach] a lot better and I would like to try it in my middle school setting." She still believed that students should be responsible for their own learning, wanting to learn and wanting to find out the best way to learn for themselves, whereas teachers should play a role as a resource. At the final interview, Mary commented on her *Studio Experience*:

> I like to learn by doing. My best classes were my hardest where I was expected to learn different things on my own. It gave me an opportunity to learn things that I would actually use in my classroom at school. During straight lectures, I tend to lose focus. I know that I can daydream a little during lectures because I can always go back and read the material. This class is broken down nicely. We are changing up more and learning more in collaboration. Excellent!

Similarly, Katie felt that the *Studio* courses matched well to her learning style.

> I think that kind of being thrown in with very little instruction is a good way for me to learn how to do things. I don't think that works for everybody but…I don't like to have things explained to me in great detail immediately. I like to figure them out on my own and so I would rather be given a kind of nebulous problem and figure it out and then have somebody be available to me for questions along the way if I have them.

Katie's interest in and confidence of learning in student-centered learning environments increased. Katie believed that students were more active in the *Studio*, and thus they were able to retain more information and to apply it to real problems:

> My first semester in the *Studio*, I learned a software program that I'd never learned before and it was a great experience for me and it was the first time that I'd ever been in a class where there were so much freedom, you know, to kind of do things how we wanted to do

them and at our own pace. And I really benefited from that because I was able to do it on my own time and I got really excited about it and worked on it more often than I would have if we were in a structured situation.

As mentioned earlier, however, not all of the participants with constructivist beliefs enjoyed the *Studio* courses. Those who had minimal background in technology and a low self-efficacy about technology complained about the lack of support and interaction, and they experienced conflict, thinking that their beliefs about teaching and learning may not serve them as well as they had originally thought. As the semester passed the midpoint and more opportunities to interact with others were provided, students were able to overcome this conflict. Although they wished to have more support and interaction at the beginning of the courses, they finally realized that their initial beliefs about teaching and learning were valid to themselves. Initially, for example, Julie stated, "I am very philosophically in tune with the pedagogy for this course and for the entire *Design Studio*." However, she had difficulties learning the new computer programs on her own and wished to have direct instruction, mentorship, and more interaction with peers at the midpoint of the semester. After the midpoint, she had more chances to get support from the instructors and her peers, which helped her to overcome the difficulties of learning new computer programs in the *Studio*. Indeed, she had challenging yet rewarding experiences in the *Studio*:

> The other the thing that saved me was the generous attention, help, and support, from classmates, TA's and professors. I got so much support and help throughout the entire semester. It would have been so discouraging if I had been entirely on my own. And I did get discouraged but it usually lasted only until I got into class on Thursday where lots

> of people gave me help and encouragement. I always left class feeling like I was making progress and the project would be succeed after all.

Finally, Julie confirmed her initial belief about teaching and learning and acknowledged that the *Studio* "reinforced a lot of my convictions that student-centered learning is definitely superior." Julie still believed that teachers should facilitate learning by providing relevant information and opportunities for students to have hands-on experiences and guiding students' reflections on their experiences. She also believed that students should be self-directed and internalize their responsibility for their own learning; that is, students should be active members of the learning community and willing to help each other instead of being passive receptacles of learning. Julie believed that students in traditional teacher-directed classrooms could not have had learning outcomes like they had in the *Studio*:

> I'm more convinced that in anything that you're teaching, in any classroom, it [the student-centered learning] is better. The more student-centered, the more interactive, the more community-oriented, service-oriented it is, the better.…I kept hearing over the years, people saying, "Well, yeah, it works over here but it's never going to work over there in that field or in that environment" and I'm totally convinced now that it's just a matter of imagining it differently no matter what you're doing or what you're teaching.

Susan's beliefs about teaching and learning remained the same throughout her *Studio* experience. Although Susan experienced a conflict during the semester, she felt that the *Studio Experience* confirmed her beliefs about teaching and learning and increased her confidence and interest in learning in student-centered learning environments:

> I thought it was a good approach the whole time I've been in the program. I've enjoyed because it was different from the way it was when I got my other two degrees. I don't

> know that I've changed a whole lot but I've probably feel even more positive about it now than I did before I took the *Studio* class.

Susan was very proud of what she learned and accomplished in her first *Studio* course, and she was excited to show her project. She felt happy because "I had not known anything about it [the computer program] when I first started the class in January; I thought I'd come a long way in four months." Susan added the following:

> Had this course been taught in a "traditional" manner where we were told or shown how to use the technology, the outcome definitely would not have been so positive. It has been an immensely valuable experience to me to be able to sit at my computer and work through the process of creating my project. When I had the opportunity and the responsibility of independently solving problems and dealing with setbacks on my own, it just made the results and final outcome that much more meaningful.

Second, there were also cases where the participants with reproductive beliefs confirmed that their reproductive beliefs were valid. Although Beth came to understand the student-centered learning approach better, her belief that learning in student-centered learning environments would be difficult had been solidified. Beth was disappointed in the *Studio Experience*, believing that she would have learned and explored more in a traditional teacher-directed classroom. She wished to have step-by-step instruction. Likewise, Emily was a very structured student and liked direct instruction. She would have liked more direction in the *Studio*:

> I liked the fact that I could pick a project about anything I wanted to but I think I would have enjoyed it more had it been mapped out like, "it has to have these criteria, include this and this," I'm just a very structured person. I like concrete structured things that I can see and know what to do.

Emily felt more frustrated and overwhelmed in the beginning *Studio* course, and she would have preferred to have more structured instruction that would have presented information in a step-by-step manner.

Appreciation

Appreciation refers to students' recognition of the worthiness of the *Studio* approach. Although the participants with reproductive beliefs about teaching and learning did not change their initial beliefs, they came to acknowledge that the *Studio* approach based on constructivist beliefs was also valid and worthy. They saw great potential in the approach and thought that students should be exposed to this different way of teaching. Students should be open new ways of teaching and learning and should be able to adapt to different learning environments. Sara, for example, enjoyed the extent to which she was able to choose what she wanted to accomplish in the *Studio* courses. She appreciated the *Studio* approach and she felt that students need to learn in different ways:

> It does provide a different kind of learning environment. I think it's important for students to have….Overall, I think they did a good job of teaching us to learn in a different way and the more different ways you can learn, the more successful you're going to be in whatever you try.

At the same time, she expected to have more structure in the *Studio* for her tool learning and her independent project since she lacked prior background in computer tools. She believed that effective teaching is one where students receive quick and helpful feedback on their learning process and their work. Due to the lack of structure and guidance, she was frustrated in the *Studio*. She shared her beliefs:

> I don't think teacher-directed and student-centered are mutually exclusive….Maybe a metaphor is when you're child is learning to ride a bicycle, it is very much child-centered but you don't just hand a child the bike and say "Go out there and figure out how to learn it," you go along and keeping him from falling and saying 'Don't forget to pedal," those kinds of hints. And for me…that kind of structure really helps me. So, I don't see teacher-directed and student-centered as being mutually exclusive, I think they can work together.

Scott also appreciated the *Studio* approach. Although his belief about teaching and learning was not changed, he enjoyed learning independently and in a group, as he had a strong background in computer tools.

Withdrawal

Withdrawal refers to the retraction of students' initial beliefs about teaching and learning. It is an alteration of beliefs to more reproductive beliefs about teaching and learning following negative learning experiences. Initially, Jennifer had relatively strong constructivist beliefs and liked to learn things independently. Jennifer expected to learn more in the *Studio* and many questions during the workshops. However, she found herself feeling uncomfortable because she felt that she frustrated others in the course. The uncomfortable feeling made her feel insecure and she did not want to ask questions in the class. Jennifer had little prior knowledge and skills, and she realized that she was not getting anywhere on her own with her current knowledge of and skills with multimedia tools. Although she needed support and guidance, she felt that she did not receive any support or help, causing her to feel even more frustrated. She said, "Even if I had gone into a course where I didn't know anything, I've never struggled or felt the frustration

that I felt with this course." Jennifer came to realize that she needed teacher-directed, step-by-step instruction:

> Going through this course even though I was only in it for halfway, that made a lot of sense to me finally, like I need it step by step, "first, when you open the program, go here," do you know what I mean? Because that makes sense to my brain.

Initially, Jennifer thought that she was a self-directed learner. However, after dropping the course, she realized that she may or may not be a self-directed learner:

> I think it depends on my comfort level. If I'm comfortable with something, I'm very self directed and I would rather just kind of lead myself but if it is something that I'm insecure about then I would much rather have someone hold my hand and walk me through it.

Transformation

Transformation refers to changes in students' beliefs toward the constructivist belief about teaching and learning. The transformation in students' beliefs seemed to result from overcoming difficult and challenging learning experiences. Brian, for example, had a relatively strong reproductive belief about teaching and learning at the beginning of the semester:

> At the beginning of the course, I kind of had this idea that I was a vessel that was going to get filled with all this new knowledge on design and storyboarding and building interactive multimedia content.

Due to the lack of direction, Brian struggled and felt that he was not prepared for the *Studio* approach at the beginning of the course. He described his struggles as a "tsunami" experience:

> It felt like a tsunami had hit me with my new role of, essentially, finding my own way with curriculum materials and course goals. It was overwhelming to me. I would

> concur…that this was a dramatic shift in roles from the classical teacher-student relationship I was used to in an academic environment.

Brian even considered dropping the course at the midpoint of the semester:

> I was floundering at the beginning trying to come up with ideas for my project, feeling without much more hands-on direction from the instructor and the group. I didn't feel I was achieving what I needed to achieve to get through the class successfully so that was what I was afraid of as far as wanting to get out of the class. I just felt like I needed to come back in a second time.

After discussing the issue with the instructor and sharing his experience with other students, he realized that he could succeed in the course and that "it's not going to be a failure" for him:

> I think that was the dramatic change that I sensed when I realized that maybe for selfish reasons that I was going to do okay, I was going to get a decent grade in the course, I was going to reach a level that I thought was good for my own abilities and when I realized that, I kind of took a whole another vantage point about the course and I felt like, "Relax and look at the course from a more holistic viewpoint." And it was a huge change in my awareness about the course at that point….This is an interesting way to learn that I've never done to this degree before and it's fun, and it's challenging and I'm going to come out of it richer and I'm going to have new skills and new abilities that I didn't have before.

After having the *Studio* experience, Brian realized that self-directed learning was very important for the master's student, saying, "I've kind of come around to various constructivist self-directed learning after this experience more so than I might have if you talked to me five or six months ago." Brian added, "It turned out, interestingly enough, to match my style a lot more closely

than I thought it would." Brian came to believe that teaching is working with students, instead of transferring knowledge onto students, and that students should have some flexibility in their own learning process.

Brian described the *Studio* approach as an "enriching and eye opening" course. Finally, he became a proponent of the student-centered learning approach:

> I'm a huge proponent of it now. I wasn't so much early on, I didn't know anything before I came into the course but if I were teaching, this would likely be the kind of course I would want to teach maybe as opposed to a more teacher centered course so I'm a big fan of it, a big fan of the process with a few adjustments.

Brian felt that his confidence level in the student-centered learning environment had increased and that he would be less afraid next time with this type of learning experience. However, he also felt that he should have basic knowledge and skills to be successful in this learning environment:

> I feel like I need to get some more of the program under my belt and maybe work with the faculty a little bit more and do some more personal research in the field before I can come back and tackle another *Studio*. I don't think I'm as prepared as I fully need to be. So, I don't know if I'm different in that regard but I don't think I'm totally prepared for 6200 [the intermediate *Studio* course]. I think I need a little bit more time to get ready for it.

Tom had also changed his beliefs throughout his *Studio Experience*. He had built confidence from the beginning course and was a little more used to the *Studio* approach. Tom felt prepared in the intermediate course, as he knew what was expected in the course, where he

could find resources, and whom to ask for help. He felt that the *Studio* approach worked well for him. Tom came to place more emphasis on students in the learning process:

> The student role in learning is to take control of your learning, and learn more about yourself in the best ways that you learn so that you can grow as a person. But the student should be the head of that whole process, I guess if a teacher is running their class in a way where the students do feel control of what they're learning and their environment, then they're better able to learn more, to stay engaged, versus again, someone else kind of controlling them and their actions.

Tom also changed his perception of the *Studio* from being uncertain to being more confident of learning in the course.

Figure 15 represents the relationship between students' readiness for the Studio and their learning experiences in the courses. It shows how students' beliefs about teaching and learning and their self-efficacy about technology were associated with their learning experiences and reactions to the courses.

	Students' learning experiences and their reactions to the *Studio*	
Constructivist belief	The students had difficulty learning the new computer programs without step-by-step instruction. Students' perceptions of the *Studio* varied according to their perceived level of comfort. The students experienced a conflict in their beliefs. Withdrawal of the belief occurred without appropriate support and guidance.	The students had a great learning experience, enjoying much freedom and self-directed learning. They confirmed their beliefs about teaching and learning.
Reproductive belief	The students wished to learn the computer tools in teacher-led classrooms. They confirmed their beliefs about teaching and learning.	Although the students may have had difficulty learning in the *Studio* initially, they were able to adapt to the *Studio*. They came to appreciate the new approach to teaching. Furthermore, transformation of the beliefs occurred when the students overcame the difficulty.
	Low	**High**
	Self-efficacy about technology	

Figure 15. Relationships among students' beliefs, learning experiences, and reactions to the *Studio*.

Chapter Summary

This chapter presented the major themes and their relationships regarding the students' positioning in, perceptions of, and reactions to the *Studio*. This study showed that the participants' beliefs about teaching and learning varied; although they had learned mostly in teacher-directed classrooms, not all the participants' beliefs about teaching and learning were reproductive ones. This study also found that students' perceptions of the *Studio* and their reactions to the courses were primarily influenced by the interaction between their readiness for the *Studio Experience* and the *Studio* learning environment. Students' beliefs about teaching and learning and their prior knowledge and skills influenced their perceptions of the student-centered

learning environment and their reactions to the courses. The next chapter concludes this study with several implications of design and implementation of student-centered learning environments, based on the findings of this study.

CHAPTER VI

DISCUSSION AND CONCLUSIONS

Based on each individual profile regarding his or her belief about teaching and learning presented in Chapter 4, the previous chapter identified the major themes and their relationships regarding students' readiness for, perceptions of, and reactions to the *Studio*. This chapter presents an overview of this study and summarizes the findings for the main research questions. The implications for practice and for further research are discussed as well.

Overview of the Study

One of the main goals of education is to empower people to be self-directed, lifelong learners who can continue developing themselves as whole persons. Teachers and educational practitioners can encourage students to become independent, autonomous learners by changing the learning context to being more student-centered. Along with the overt knowledge and skills that students knew were being covered in the *Studio*, there was a *hidden curriculum* (Snyder, 1971). Snyder emphasizes the hidden curriculum in any classroom:

> The question for the student is not only what he will learn but how he will learn. These covert, inferred tasks, and the means to their mastery, are linked together in a hidden curriculum. They are rooted in the professors' assumptions and values, the students' expectations, and the social context in which both teacher and taught find themselves. (p. 4)

The hidden curriculum of student-centered learning environments is to encourage students to become self-directed learners. Students learning through this new approach are

expected to be independent from teachers and to take responsibility for their own learning. However, there was a question of whether students were ready to learn on their own and how they responded to constructivist, student-centered learning environments. Students' problems with directing their own learning or adapting themselves to new learning approaches may be associated with students' beliefs (Schommer, 1994). Considering that learning is a product of the interaction between the individual and the context (Merriam & Caffarella, 1999), how students interact with learning environments is a key to understand student learning.

This study explored students' beliefs about teaching and learning and how their beliefs influenced their interaction with a student-centered learning environment in a graduate program. Because the difference between students' beliefs about teaching and learning and the expectations about students' roles in student-centered learning environments was expected, it was important to examine how their beliefs influenced their interaction with the learning environment and whether their beliefs could accommodate the new approach. Thus, this study of the *Studio Experience* examined (a) whether graduate students' beliefs about teaching and learning were compatible with the assumptions of the student-centered learning environment, (b) whether students' beliefs about teaching and learning influenced their perceptions of the *Studio*, and (c) whether students' beliefs changed through their learning experiences in the *Studio* courses.

Discussion of the Findings

Modified from Figure 3 presented in Chapter 2, Figure 16 represents the findings from this study. The findings from this study are presented and discussed according to the main research questions.

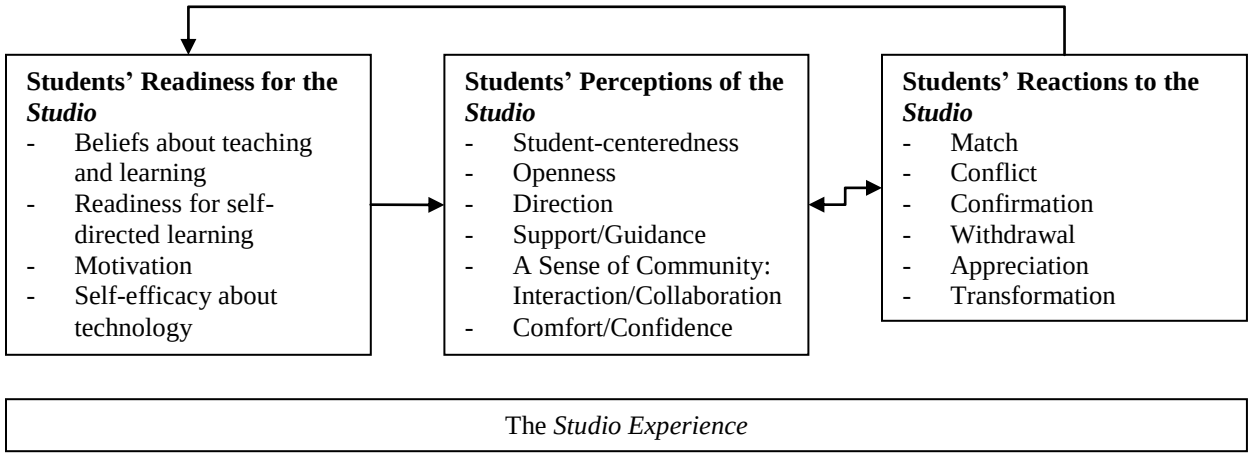


Figure 16. Framework for understanding students' *Studio Experiences.*

Compatibility of Students' Beliefs with the Expectations of the Studio

Two major findings regarding the first research question emerged from this study. First, although the participants had not experienced self-directed, student-centered learning before they entered the *Studio*, not all of them had reproductive beliefs about teaching and learning. Before this study, it was assumed that most of the students coming into the *Studio* would have reproductive beliefs about teaching and learning, as they had previously learned mostly in teacher-directed instructional environments. However, the participants in this study acknowledged that teaching and learning are not limited to transmission and acquisition of knowledge. Students who had constructivist beliefs about teaching and learning emphasized the active roles of students, which includes seeking out resources and constructing new meanings and knowledge from the resources. Although students with reproductive beliefs about teaching and learning tended to put a greater emphasis on knowledge transmission and its acquisition, all of the participants recognized various meanings of teaching and learning according to learning contexts. Therefore, students' beliefs about teaching and learning seem to be formed individually as a result of their interactions with surrounding contexts; age, gender, previous

learning and working experiences, and departmental, institutional, and working cultures might influence the formation of their beliefs.

Second, there was no clear difference in students' initial beliefs based on their stages of the *Studio Experience*. Before this study, it was assumed that there would be different patterns among the participants based on their experiences in the *Studio* courses. Because of their previous *Studio* courses, the participants in the intermediate and the advanced courses were expected to have beliefs more aligned with constructivist beliefs and more positive perceptions of the *Studio* than were students in the beginning course. However, the interviews with the students in the beginning *Studio* course showed that the majority of them had a relatively strong constructivist belief about teaching and learning, whereas only a few participants in the intermediate and the advanced courses had a reproductive belief at the beginning of the courses. Therefore, the impact of the *Studio Experience* on students' beliefs seemed to be limited, and the learning experience in the *Studio* did not always bring about changes in their beliefs.

The category of students' readiness for the *Studio* was examined in this study to better understand the relationship between different student characteristics and the learning context. The category includes beliefs about teaching and learning, readiness for self-directed learning, motivation, and self-efficacy about technology. This study showed the importance of readiness for the student-centered learning environment. Knowles et al. (1998) assume that self-directedness increases as a person matures. Accordingly, adult students are regarded as active learners and they are expected to take responsibilities for their learning. This study showed that the students in this graduate program perceived themselves as self-directed learners. However, students' experiences of self-directed learning in the *Studio* varied. Some students, for example, were not comfortable learning in the *Studio*, and their perceptions were challenged throughout

the semester. The participants in this study who expressed discomfort with the *Studio* also realized that their abilities of self-direction in the *Studio* were dependent upon the interaction between their readiness for the *Studio* and the learning environment. Boud (1988) acknowledges that "students often need considerable learning skills to be able to make full use of the opportunities that are available to them" (p. 24). This study indicated that, along with their beliefs, self-efficacy about technology, in particular, was essential for students to benefit from the self-directed learning opportunities in the *Studio*. Self-efficacy about technology was critical for students' successful learning experiences and influenced students' adaptability to the new learning environment.

Students' Beliefs and Their Perceptions of the Studio Experience

There were three findings regarding the second research question. First, students' beliefs about teaching and learning were related to their perceptions of the *Studio* courses. Students' initial perceptions were influenced by their beliefs about teaching and learning and were modified throughout the semester based on interactions with their present learning contexts. All participants concurred that the *Studio* was a constructivist, student-centered learning environment and that the courses expected students to be active members of the learning community. However, while the participants with constructivist beliefs perceived the *Studio* to be well-structured and well-designed courses, the students who had reproductive beliefs considered the courses to be too unstructured. Therefore, students with reproductive beliefs were more likely to find the *Studio* confusing and frustrating because of the design of the student-centered learning environment.

Second, students' prior knowledge and skills had a significant impact on their perceptions of the student-centered learning environment. The students with low self-efficacy about

technology wanted to have more teacher input and support in the learning process, while students with high self-efficacy about technology perceived the *Studio* to be a course where they could get support as they needed. Therefore, in this study, the data show that the interaction between students' beliefs about teaching and learning and their prior knowledge and skills of technology was highly related to their perceptions of the learning environment.

Third, regardless of beliefs about teaching and learning, conflict and tension occurred when the *Studio* courses did not meet students' expectations of student-centered learning environments. The participants, for example, expected to have more interaction with other students in the *Studio*, as they believed that the courses were supposed to foster frequent and active interaction. Students in the beginning course, in particular, complained about the lack of interaction opportunities, which delayed the development of a sense of learning community. The lack of interaction, in turn, influenced the level of students' comfort and confidence about learning in the courses.

Students' Reactions to the Studio Experience

Students' beliefs have been formed throughout their life, in both formal and informal learning situations. Accordingly, changes in their beliefs may not occur quickly. However, this does not mean that the beliefs are static and remain the same over periods of time. Beliefs about teaching and learning can evolve as students experience new teaching and learning environments. Johnson and Johnson (2009) argue that intellectual conflict can be highly desirable because it motivates students to learn more. Likewise, new environments can challenge students' beliefs about teaching and learning and trigger changes in those beliefs. Regarding the third research question, this study showed that students' learning experiences in the *Studio* resulted in six

different types of reactions in their beliefs about teaching and learning in the *Studio* courses as shown in Figure 17: match, conflict, confirmation, withdrawal, appreciation, and transformation.

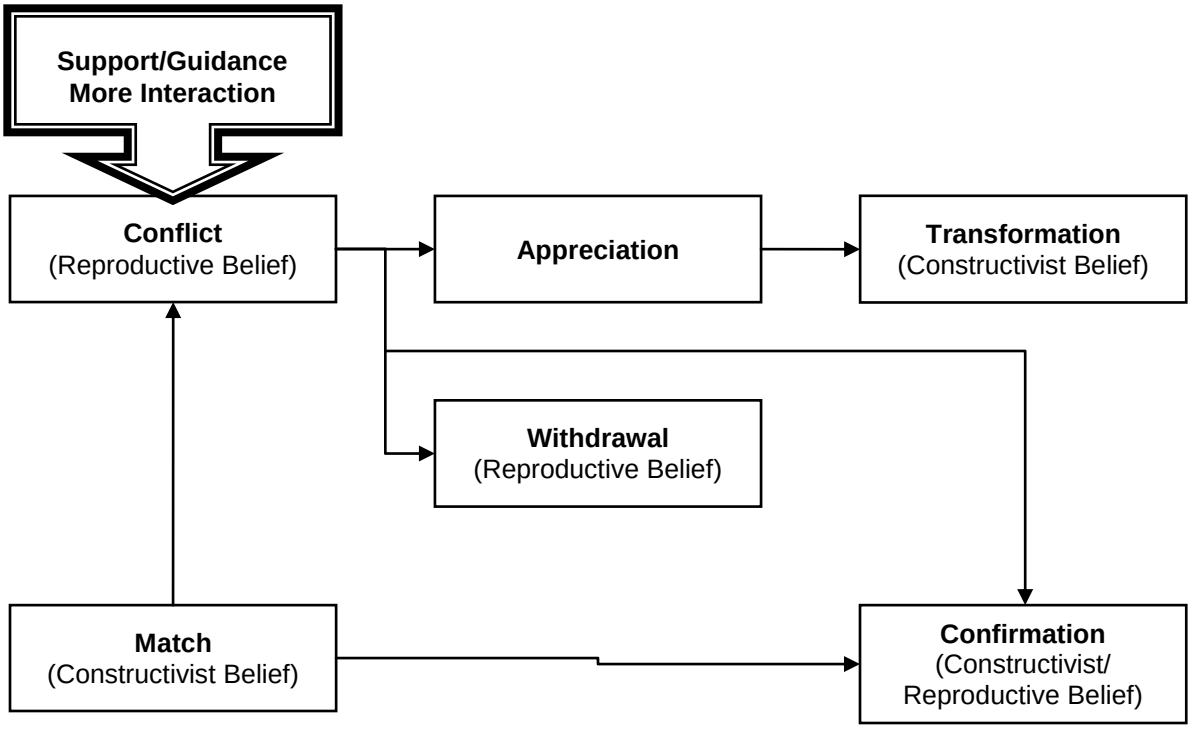


Figure 17. Students' reactions to the *Studio.*

The students' reactions were influenced by the interaction between their initial beliefs and their prior skills and knowledge about the subject matter. Initially, many students were comfortable with being taught rather than learning independently due to their previous learning experiences. Students with little background knowledge and skills regarding computer tools were mostly frustrated in this self-directed learning environment. Even students who understood the student-centered learning approach and their expected roles expressed concerns about the lack of support and guidance and the lack of interaction. The participants realized that their adaptability to learning environments depended on the subject matter. However, those who held

constructivist views and high self-efficacy about technology enjoyed learning independently in the courses and confirmed their beliefs. Also, students who had reproductive beliefs and high self-efficacy about technology were able to adapt to the *Studio* approach and appreciated the new way of teaching and learning.

Transformation of students' beliefs about teaching and learning did not occur easily. It occurred when students overcame difficulties and conflicts that challenged their beliefs and abilities and made them frustrated. The more that students were challenged and frustrated, the more possibility there was for them to change their beliefs once they got over the difficulties. Brian described his struggles as a "tsunami" experience and even considered dropping the course. However, after overcoming some obstacles, he experienced a "dramatic change" in his perspective. Transformation of students' beliefs seemed to be triggered by a conflicted, yet "enriching and eye opening," experience.

Additionally, learning experiences in the *Studio* allowed students to better understand student-centered learning approaches and students' roles and to increase their confidence about learning in new learning environments. Students appreciated the new approaches and they believed that they became more adaptive to different types of teaching and learning, which is a necessary skill for lifelong learners.

Implications for Practice

A student-centered learning environment is a place where students construct meanings and knowledge while they work on authentic problems. Students are expected to be active participants in the construction of knowledge, and teachers play roles as guides and facilitators. Because students can build on their interests, abilities, needs, and motivations, they should be able to get more out of the student-centered learning approach. However, the expected positive

outcome mostly depends on students' readiness for the student-centered learning and teachers' support of students' learning. Students must be prepared to be self-directed learners and ready to be active in learning contexts if they expect to be successful in student-centered learning environments. Also, even though students are self-directed learners, they would not be satisfied with learning experiences in student-centered learning environments without appropriate support and guidance.

Findings from this study indicated that successful implementation of a student-centered learning environment was highly related to how and when support and guidance should be provided for student learning. Teachers must be prepared to serve as facilitators of student learning if they expect to be successful in student-centered learning environments. Teachers, as facilitators, need to facilitate the development of a learning culture (Brookfield, 1986) in which students are supported for self-directed learning. The following are recommendations for teachers and educational practitioners when they consider the design and implementation of *Studio*-like courses:

- Acknowledge students' individual differences
- Provide personal support and guidance
- Foster gradual transition for students to become self-directed learners
- Encourage students to interact with others
- Use technology to leverage students' learning

Individual Differences

Student-centered learning begins with knowing and understanding students, and teachers and educational practitioners should address what students bring into classrooms. McCombs and Whisler (1997), in the preface of their book *The Learner-Centered Classroom and School*,

suggest that "knowing and understanding each learner is essential to helping the learner feel connected to, supported by, and respected by his or her teachers and other adults in the educational setting" (p. xii). Students in higher education bring diverse cultural, professional, and academic backgrounds into the classroom, such as prior learning experiences, attitudes toward learning, motivations, abilities, background knowledge and skills, and learning styles. These individual differences should be taken into account in the learning process in order to effectively support students' learning in student-centered learning environments.

The participants in this study believed that teachers should be flexible and should accommodate students' different styles, needs, interests, and abilities. The findings of this study show that the level of students' self-efficacy about technology, particularly within the *Studio* was quite varied, bringing about different learning experiences in the courses. Emphasizing the analysis of students' current knowledge and skills is nothing new to teachers and instructional designers. Teachers design and deliver instruction based on an analysis of students' knowledge. The primary reason for appreciating individual differences in student-centered learning environments, however, is to guide and support students' knowledge construction, not to instruct students well as a whole group. Knowing and understanding individual differences allows teachers to provide support and guidance tailored to students' different characteristics.

Personal Support and Guidance

There is a misunderstanding about student-centered, self-directed learning. One of the common misconceptions is that there may be less teacher input in these types of classes than in teacher-led classes because of the student-centeredness and the focus on self-directed learning. Kirschner et al. (2006), for example, called various forms of constructivist, student-centered learning "the minimally guided approach" (p. 75). However, student-centered learning requires

more input from teachers in different ways. Allowing students more control and ownership does not accommodate all of their individual differences (Snow, 1980). Snow recommends that teachers should "determine which learners to give what kind of control to when" (p. 158). Therefore, teachers need to carefully examine students' capabilities and provide tailored support and guidance for each student's needs.

Student-centered learning may not be as effective with learners who lack prior knowledge and skills (Clark, 2000). Therefore, student-centered learning begins by recognizing where students are and builds on their current stages. Because they have different backgrounds, prior knowledge, and skills, students have different levels of readiness for student-centered learning environments, and they need different support and guidance that is tailored to individual needs. Teachers need to determine how to support and guide students' learning in order to respond to students' needs once they recognize their differences. This study showed that the *Studio* courses were not comfortable to those who did not have basic knowledge and skills about the computer programs being learned. Teachers may need to provide well-structured, teacher-led instruction of basic knowledge and skills at the beginning of the course upon discovering that students do not have background knowledge and skills and do not know how to begin their own learning. Students without background knowledge may have difficulty finding information relevant to their learning. Students need a collection of resources and examples to look at before searching for appropriate information by themselves. Also, if students have prior knowledge and skills and can start learning on their own, teachers do not need to provide much instruction. Teachers can be resource persons who can provide information, feedback, suggestions, and recommendations when students need guidance. A facilitator, as a resource person (Brookfield, 1986), can guide individual students to resources necessary for completing their learning rather than explaining

everything in detail. Most of the participants in this study indicated that they did not rely heavily on the teachers. Rather, students wanted to have someone to ask for help or guidance when they needed it. Therefore, rather than all students listening to pre-designed instruction, they can build upon what they already know and pursue what they are interested in. If students already have basic knowledge of and skills in a multimedia design program, they do not need to listen to step-by-step instruction. Students can focus on the application of the program by designing multimedia artifacts. Tailored support and guidance can optimize students' learning experiences in student-centered learning environments.

Gradual Transition

Students may not be oriented to self-directed learning. They may resist self-directed learning approaches and want to remain teacher-dependent. Students' transition from teacher-dependent to independent learners, or their transition to self-directed learners, does not occur quickly. Considering that student-centered learning responds to individual differences and needs, teachers should help students to transition their roles into self-directed learners when they are in learning contexts that are unfamiliar to them (Grow, 1991). Introduction to the ideas of student-centered learning and self-directed learning at the early stage of these types of courses, as well as frequent communication, may help students to understand their expected roles and the goals of those courses. The clearer the goals and expectations, the more likely students are to understand their roles and to act accordingly.

Teachers should also provide opportunities for students to understand their beliefs about teaching and learning and to reflect on the beliefs that are challenged in student-centered learning environments. Encouraging self-reflection about their beliefs and their learning experiences, for example, allows students to make their beliefs explicit, understand the idea of student-centered

learning, and appreciate different ways of teaching and learning. Reflection is a process of making relations between new and previous experiences (Dewey, 1933). Mezirow (1991) regards reflection as being central to transformational learning. Self-reflection makes learning more meaningful to students, allowing students to understand their roles and experiences and to transform their roles accordingly.

Group Interaction

The emphasis on student independence does not mean that students learn in isolation from one another (Boud, 1988); rather, students are expected to become interdependent. Boud described interdependent learners as those who work with and help each other. Although students work with independent projects, they can benefit from "peer learning groups for support, information exchange, stimulus through new ideas, and locating relevant resources" (Brookfield, 1986, p. 83).

This study showed that students had high expectations of group interaction, especially in the beginning *Studio* course. Participants in this study pointed out the lack of interaction in the beginning course, which made it difficult for them to work with and help each other. Therefore, teachers implementing student-centered learning environments need to foster the development of the learning group at the early stage of courses and encourage students to support each other. The development of group interaction allows students to become comfortable in new environments and to create a sense of community. Once students become comfortable within these contexts, students are able to actively seek help from others, which makes learning more successful in student-centered learning environments.

Use of Technology

Students' learning experiences in student-centered learning environments can be enhanced with the use of technology. As Hannafin and Land (1997) note, emerging advanced technologies have great potential for the design of meaningful learning environments. Technology can be used to provide authentic learning experiences, help teachers support students' learning, and promote students' knowledge construction. Technology also allows teachers to develop and provide online resources that students are able to access anytime and to support students' learning using frequent communication. Therefore, technology can foster the development of a sense of learning community, which can lessen students' feelings of isolation.

Participants in this study appreciated the use of technology in the *Studio*. The *Studio* Website was a collection of online resources for students' mastery of tools and their projects. Students, in particular, had access to projects and documentation completed by previous *Studio* participants. The previous examples were helpful to those who were in the beginning course. Also, Web-based technology was used as a way for students to communicate with other students. Students' Web-based reflection, for example, allowed students to share their learning experiences and progress toward their goals. Thus, interactions with other students increased as students worked on their projects and expressed their concerns and progress in their reflections. These technology-based interactions can help students to gradually develop a learning community.

Implications for Research

Several areas for further research have been identified based on this study. First, understanding teachers' perceptions of and their teaching experiences in student-centered learning environments is an important area to explore. A basic premise of student-centered

learning environments is that students should be the center of learning situations, taking responsibility for their own learning. Students are responsible for seeking out necessary information and constructing meanings and understandings, while teachers, as facilitators, are responsible for guiding and motivating students' learning by providing relevant resources and constructivist feedback. Brookfield (1986) emphasizes the role of facilitators as "resources for learning, rather than as didactic instructors who have all the answers" (p. 63). The transition from teacher-directed instruction to more student-centered learning requires teachers to change their roles in the classroom. Instead of telling students everything that they should learn, teachers need to create learning environments where students take responsibility for their learning, working with and learning from others.

The question remains of whether teachers are ready to change their current ways of teaching and to implement more student-centered approaches in their classrooms. Teachers may not be prepared to change their roles and deal with the uncertainty that would occur in their classrooms. Teachers may also resist the new approaches to teaching (Weimer, 2002). Therefore, exploring teachers' perceptions of student-centered learning and their experiences implementing these new environments in their teaching practice would contribute to a better understanding of student-centered learning environments. Additionally, it is important to examine how teachers' learning experiences in student-centered learning environments influence their teaching practices. A few participants in this study were in-service teachers, and their interests in applying student-centered approaches to their teaching practices increased as a result of their *Studio* experiences. Although not all of them had positive learning experiences, their experiences in the *Studio* provided them with new ideas of how to design and implement the student-centered learning approach in their classrooms. Therefore, it is worthwhile to examine

how teachers' learning experiences as students in student-centered learning environments impact their teaching practices.

Second, understanding how departments and educational institutions perceive student-centered learning environments is another area for future research. Successful implementation of student-centered learning environments also requires support from departments and institutions. Considering the finding of this research that students may need background knowledge and skills to increase their readiness for student-centered learning environments, it is important to look at how courses in a department are organized and support students' readiness and how student-centered learning courses fit into the curriculum of the department.

Third, this study recognized the importance of students' prior knowledge and skills in the *Studio*. Whether students had background knowledge of and skills in multimedia design and development tools was highly related to students' perceptions of the courses and their learning experiences. Students seemed to need basic knowledge and skills to begin learning on their own in student-centered learning environments. However, further study on the impact of prior skills and knowledge in other contexts is needed to better understand the findings from this study. Also, exploring students' beliefs in undergraduate programs or in secondary schools can contribute to understanding the relationship between students' beliefs and perceptions.

Finally, aside from the topics regarding various perceptions of student-centered learning environments, there is also a need to quantitatively examine the relationship between students' beliefs and perceptions. Due to the limited generalizability of this qualitative study, a quantitative research methodology would complement our understanding of this relationship. Such a study would provide rich data to facilitate the continuous improvement of student-centered learning environments and their successful implementation.

Summary and Conclusion

The findings of this study indicate that the student-centered learning approach was worthwhile in that students were able to be exposed to a different approach, and thus, become more flexible and adaptive to new ways of teaching and learning. This study also showed that not all of the students enjoyed self-directed learning and appreciated the *Studio* approach. Therefore, teachers' roles become more important in student-centered learning environments. The continuous implementation of student-centered learning environments and further exploration may yield rich evidence for designing more effective learning environments, which can be beneficial for students.

REFERENCES

Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic Medicine, 68*(1), 52-81.

APA Work Group of the Board of Educational Affairs (1997). *Learner-centered psychological principles: A framework for school reform and redesign* (Rev. ed.). Washington, DC: American Psychological Association.

Assor, A., & Connell, J. P. (1992). The validity of students' self-reports as measures of performance affecting self-appraisals. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 25-47). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bannan-Ritland, B. (2001). Teaching instructional design: An action learning approach. *Performance Improvement Quarterly, 14*(2), 37-52.

Bendixen, L. D. (2002). A process model of epistemic belief change. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 191-208). Mahwah, NJ: Lawrence Erlbaum Associates.

Bereiter, C. (2002). *Education and mind in the knowledge age*. Mahwah, NJ: Erlbaum.

Berkson, L. (1993). Problem-based learning: Have the expectations been met? *Academic Medicine, 68*(10), S79-S88.

Bernstein, P., Tipping, J., Bercovitz, K., & Skinner, H. A. (1995). Shifting students and faculty to a PBL curriculum: Attitudes changed and lessons learned. *Academic Medicine, 70*(3), 245-247.

Bierema, L. L. (2001). Philosophy of organizational learning. In J. Gilley, P. Dean & L. L. Bierema (Eds.), *Philosophy and practice of organizational learning, performance, and change* (pp. 13-39). Cambridge: Perseus.

Biggs, J. B. (1979). Individual differences in study processes and the quality of learning outcomes. *Higher Education, 8*(4), 381-394.

Biggs, J. B. (1991). Student learning in the context of school. In J. B. Biggs (Ed.), *Teaching for learning: The view from cognitive psychology*. Hawthorn, Victoria: ACER.

Biggs, J. B., & Collis, K. F. (1982). *Evaluating the quality of learning: The SOLO taxonomy*. New York: Academic Press.

Bloom, B. S., Englehart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: Handbook I. Cognitive domain*. New York: Longman.

Bogdan, R. C., & Biklen, S. K. (1982). *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn and Bacon.

Boldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology, 41*, 63-105.

Bonk, C. J. (2002). *Online training in an online world*. Bloomington, IN: CourseShare.com.

Borko, H., Mayfield, V., Marion, S., Flexer, R., & Cumbo, K. (1997). Teachers' developing ideas and practices about mathematics performance assessment: Successes, stumbling blocks, and implications for professional development. *Teaching and Teacher Education, 13*(3), 259-278.

Boud, D. (Ed.). (1988). *Developing student autonomy in learning* (2nd ed.). London: Kogan Page.

Boud, D., Cohen, R., & Walker, D. (Eds.). (1993). *Using experience for learning*. Bristol, PA: Open University Press.

Boulton-Lewis, G. M., Smith, D. J. H., McCrindle, A. R., Burnett, P. C., & Campbell, K. J. (2001). Secondary teachers' conceptions of teaching and learning. *Learning and Instruction, 11*(1), 35-51.

Bramald, R., Hardman, F., & Leat, D. (1995). Initial teacher trainees and their views of teaching and learning. *Teaching and Teacher Education, 11*(1), 23-31.

Brandes, D., & Ginnis, P. (1986). *A guide to student-centered learning*. Oxford, England: Basil Blackwell.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Bransford, J. D., Goin, L. I., Hasselbring, T. S., Kinzer, C. K., Sherwood, R. D., & Williams, S. M. (1986). Learning with technology: Theoretical and empirical perspectives. *Peabody Journal of Education, 64*(1, Beyond the Computer Revolution), 5-26.

Bransford, J. D., Sherwood, R. D., Hasselbring, T. S., Kinzer, C. K., & Williams, S. M. (1990). Anchored instruction: Why we need it and how technology can help. In D. Nix & R. Spiro (Eds.), *Cognition, education, and multimedia* (pp. 115-141). Hillsdale, NJ: Erlbaum.

Brookfield, S. D. (1986). *Understanding and facilitating adult learning*. San Francisco: Jossey-Bass Publishers.

Brooks, J. G., & Brooks, M. G. (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.

Brown, A. L., & Palincsar, A. S. (1989). Guided, cooperative learning and individual knowledge acquisition. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 393-451). Hillsdale: NJ: Erlbaum.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Brush, T., & Saye, J. (2000). Implementation and evaluation of a student-centered learning unit: A case study. *Educational Technology Research and Development, 48*(3), 79-100.

Cady, J., Meier, S. L., & Lubinski, C. A. (2006). Developing mathematics teachers: The transition from preservice to experienced teacher. *Journal of Educational Research, 99*(5), 295-305.

Caffarella, R. (1993). Self-directed learning. *New directions for adult and continuing education, 57*, 25-35.

Caffarella, R., & Merriam, S. B. (2000). Linking the individual learner to the context of adult learning. In E. Hayes & A. Wilson (Eds.), *Handbook of adult and continuing education* (pp. 55-70). San Francisco: Jossey-Bass.

Cano, F. (2005). Epistemological beliefs and approaches to learning: Their change through secondary school and their influence on academic performance. *British Journal of Educational Psychology, 75*(2), 203-221.

Cassidy, S. (2004). Learning styles: An overview of theories, models, and measures. *Educational Psychology, 24*(4), 419-444.

Chan, K. W., & Elliott, R. G. (2004). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education, 20*(8), 817-831.

Chang, C. Y., & Barufaldi, J. P. (1999). The use of a problem-solving-based instructional model in initiating change in students' achievement and alternative frameworks. *International Journal of Science Education, 21*(4), 373-388.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 509-535). Thousand Oaks, CA: Sage.

Charmaz, K. (2002). Qualitative interviewing and grounded theory analysis. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context & method* (pp. 675-694). Thousand Oaks, CA: Sage Publications.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. London: Sage.

Clark, R. C. (2000). Four architectures of instruction. *Performance Improvement, 39*(10), 31-38.

Clement, J., Brown, D. E., & Zietsman, A. (1989). Not all preconceptions are misconceptions: Finding 'anchoring conceptions' for grounding instruction on students' intuitions. *International Journal of Science Education, 11*(5), 554-565.

Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Erlbaum.

Colliver, J. A. (2000). Effectiveness of problem-based learning curricula: Research and theory. *Academic Medicine, 75*(3), 259-266.

Conti, G. J. (2004). Identifying your teaching styles. In M. Galbrith (Ed.), *Adult learning methods: A guide for effective instruction* (3rd ed., pp. 75-93). Malabar, FL: Krieger.

Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 13*(1), 3-21.

Crawford, K., Gordon, S., Nicholas, J., & Prosser, M. (1994). Conceptions of mathematics and how it is learned: The perspectives of students entering university. *Learning and Instruction, 4*(4), 331-345.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

CTGV (1990). Anchored instruction and its relationship to situated cognition. *Educational Researcher, 19*(6), 2-10.

CTGV (1992). The Jasper experiment: An exploration of issues in learning and instructional design. *Educational Technology Research and Development, 40*(1), 65-80.

Cuban, L. (1990). Reforming again, again, and again. *Educational Researcher, 19*(1), 3-13.

Davenport, J., & Davenport, J. (1985). A chronology and analysis of the andragogy debate. *Adult Education Quarterly, 35*(3), 152-159.

de Jong, T., & van Joolingen, W. R. (1998). Scientific discovery learning with computer simulations of conceptual domains. *Review of Educational Research, 68*(2), 179-201.

Dewey, J. (1933). *How we think.* Boston: D.C. Heath and company.

Deyhle, D. L., Hess, A. G., Jr., & LeCompte, M. D. (1992). Approaching ethical issues for qualitative researchers in education. In M. D. LeCompte, W. L. Millory & J. Preissle (Eds.), *The handbook of qualitative research in education* (pp. 597-641). San Diego, CA: Academic Press.

Dochy, F., Segers, M., Bossche, P. V. D., & Struyven, K. (2005). Students' perceptions of a problem-based learning environment. *Learning Environments Research, 8*(1), 41-66.

Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: a meta-analysis. *Learning and Instruction, 13*(5), 533-568.

Duell, O. K., & Schommer-Aikins, M. (2001). Measures of people's beliefs about knowledge and learning. *Educational Psychology Review, 13*(4), 419-449.

Duffy, T. M., & Jonassen, D. H. (1992). Constructivism: New implications for instructional technology. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 1-16). Hillsdale, NJ: Erlbaum.

Dunkin, M. J. (1990). The induction of academic staff to a university: Processes and products. *Higher Education, 20*(1), 47-66.

Dunkin, M. J., & Biddle, B. J. (1974). *The study of teaching*. New York: Holt, Rinehart and Winston.

Dunkin, M. J., & Precians, R. P. (1992). Award-winning university teachers' concepts of teaching. *Higher Education, 24*(4), 483-502.

Eisenhart, M. A., & Howe, K. R. (1992). Validity in educational research. In M. D. LeCompte, W. L. Millory & J. Preissle (Eds.), *The handbook of qualitative research in education* (pp. 643-680). San Diego, CA: Academic Press.

Elias, J. L., & Merriam, S. B. (1995). *Philosophical foundations of adult education* (2nd ed.). Malabar, FL: Krieger.

Entwistle, N. J. (1987). A model of the teaching-learning process. In J. T. E. Richardson, M. W. Eysenck & D. W. Piper (Eds.), *Student learning: Research in education and cognitive psychology* (pp. 13-28). London: SRHE and Open Univeristy Press.

Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. New York: Nichols Publishing Company.

Entwistle, N. J., & Tait, H. (1990). Approaches to learning, evaluations of teaching, and preferences for contrasting academic environments. *Higher Education, 19*(2), 169-194.

Entwistle, N. J., & Walker, P. (2002). Strategic alertness and expanded awareness within sophisticated conceptions of teaching. In N. Hativa & P. Goodyear (Eds.), *Teacher thinking, beliefs and knowledge in higher education* (pp. 15-39). Dordrecht: Kluwer Academic Publishers.

Ertmer, P. A., & Cennamo, K. S. (1995). Teaching instructional design: An apprenticeship model. *Performance Improvement Quarterly, 8*(4), 43-58.

Ertmer, P. A., Newby, T. J., & MacDougall, M. (1996). Students' responses and approaches to case-based instruction: The role of reflective self-regulation. *American Educational Research Journal, 33*(3), 719-752.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research, 38*(1), 47-65.

Fiddler, M. B., & Knoll, J. W. (1995). Problem-based learning in an adult liberal learning context: Learner adaptations and feedback. *Continuing Higher Education Review, 59*(1), 13-24.

Fitzgerald, G. E., Wilson, B., & Semrau, L. P. (1997). An interactive multimedia program to enhance teacher problem-solving skills based on cognitive flexibility theory: Design and outcomes. *Journal of Educational Multimedia and Hypermedia, 6*(1), 47-76.

Fox, D. (1983). Personal theories of teaching. *Studies in Higher Education, 8*(2), 151-163.

Fraser, B. J., & Fisher, D. L. (1982). Predicting students' outcomes from their perceptions of classroom psychosocial environment. *American Educational Research Journal, 19*(4), 498-518.

Fraser, B. J., & Rentoul, A. J. (1980). Person-environment fit in open classrooms. *Journal of Educational Research, 73*(3), 159-167.

Freeman, M., deMarrais, K., Preissle, J., Roulston, K., & St. Pierre, E. A. (2007). Standards of evidence in qualitative research: An incitement to discourse. *Educational Researcher, 36*(1), 25-32.

Gagné, R. M. (1985). *The conditions of learning and theory of instruction* (4th ed.). New York: CBS College Publishing.

Gagné, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (2005). *Principles of instructional design* (5th ed.). Belmont, CA: Thomson/Wadsworth.

Galbraith, M. W. (2004). The teacher of adults. In M. Galbrith (Ed.), *Adult learning methods: A guide for effective instruction* (3rd ed., pp. 3-21). Malabar, FL: Krieger.

Ge, X., Chen, C.-H., & Davis, K. A. (2005). Scaffolding novice instructional designers' problem-solving processes using question prompts in a web-based learning environment. *Journal of Educational Computing Research, 33*(2), 219-248.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. Chicago: Aldine.

Glasgow, N. A. (1997). *New curriculum for new times: A guide to student-centered, problem-based learning*. Thousand Oaks, CA: Corwin Press.

Gow, L., & Kember, D. (1993). Conceptions of teaching and their relationship to student learning. *British Journal of Educational Psychology, 63*(1), 20-33.

Grow, G. O. (1991). The staged self-directed learning model. In H. B. Long & Associates (Eds.), *Self-directed learning: Consensus & conflict* (pp. 199-227). Norman, OK: Oklahoma Research Center for Continuing Professional and Higher Education of the University of Oklahoma.

Hannafin, M. J., Hannafin, K., Land, S., & Oliver, K. (1997). Grounded practice and the design of constructivist learning environments. *Educational Technology Research and Development, 45*(3), 101-117.

Hannafin, M. J., Hill, J. R., & Land, S. M. (1997). Student-centered learning and interactive multimedia: Status, issues, and implications. *Contemporary Education, 68*(2), 94-97.

Hannafin, M. J., & Land, S. M. (1997). The foundations and assumptions of technology-enhanced student-centered learning environments. *Instructional Science, 25*(3), 167-202.

Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning environments. *Educational Technology Research and Development, 48*(3), 23-48.

Hill, J. R., & Land, S. M. (1998). *Open-ended learning environments: A theoretical framework and model for design*. Paper presented at the Convention of the Association for Educational Communications and Technology, St. Louis, MO.,

Hmelo-Silver, C. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235-266.

Hofer, B. K. (2001). Personal epistemology research: Implications for learning and teaching. *Educational Psychology Review, 13*(4), 353-383.

Hofer, B. K. (2002). Personal epistemology as a psychological and educational construct: An introduction. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 3-14). Mahwah, NJ: Lawrence Erlbaum Associates.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(1), 88-140.

Howard, B. C., McGee, S., Schwartz, N., & Purcell, S. (2000). The Experience of constructivism: Transforming teacher epistemology. *Journal of Research on Computing in Education, 32*(4), 455-465.

Hung, W., Bailey, J. H., & Jonassen, D. H. (2003). Exploring the tensions of problem-based learning: Insights from research. *New Directions for Teaching & Learning*(95), 13-23.

Jacobson, M. J., & Archodidou, A. (2000). The design of hypermedia tools for learning: Fostering conceptual change and transfer of complex scientific knowledge. *Journal of the Learning Sciences, 9*(2), 145-199.

Jarvis, P. (1987). *Adult learning in the social context*. London: Croom Helm.

Jehng, J.-C. J., Johnson, S. D., & Anderson, R. C. (1993). Schooling and students' epistemological beliefs about learning. *Contemporary Educational Psychology, 18*(1), 23-35.

Johnson, D. W., & Johnson, R. T. (2009). Energizing learning: The instructional power of conflict. *Educational Researcher, 38*(1), 37-51.

Jonassen, D. H. (1992). What are cognitive tools? In P. A. M. Kommers, D. H. Jonassen & J. T. Mayes (Eds.), *Cognitive tools for learning* (pp. 1-7). New York: Springer-Verlag.

Jonassen, D. H. (1997). Instructional design models for well-structured and iII-structured problem-solving learning outcomes. *Educational Technology Research and Development, 45*(1), 65-94.

Jonassen, D. H. (2003). Using cognitive tools to represent problems. *Journal of Research on Technology in Education, 35*(3), 362.

Jonassen, D. H., & Grabowski, B. L. (1993). *Handbook of individual differences, learning, and instruction*. Hillsdale, NJ: Erlbaum.

Jonassen, D. H., & Reeves, T. C. (1996). Learning with technology: Using computers as cognitive tools. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 693-719). New York: Simon & Schuster Macmillan.

Jonassen, D. H., & Rohrer-Murphy, L. (1999). Activity theory as a framework for designing constructivist learning environments. *Educational Technology Research and Development, 47*(1), 61-79.

Kagan, D. M. (1990). Ways of evaluating teacher cognition: Inferences concerning the Goldilocks Principle. *Review of Educational Research, 60*(3), 419-469.

Kagan, D. M. (1992). Implication of research on teacher belief. *Educational Psychologist, 27*(1), 65-90.

Kaufman, D. M., & Mann, K. V. (1996). Students' perceptions about their courses in problem-based-learning and conventional curricula. *Academic Medicine, 71*(1), S52-S54.

Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction, 7*(3), 255-275.

Kember, D. (2001). Beliefs about knowledge and the process of teaching and learning as a factor in adjusting to study in higher education. *Studies in Higher Education, 26*(2), 205-221.

Kember, D., & Gow, L. (1994). Orientations to teaching and their effect on the quality of student learning. *The Journal of Higher Education, 65*(1), 58-74.

Khan, B. H. (1997). Web-based instruction (WBI): What is it and why is it? In B. H. Khan (Ed.), *Web-Based Instruction* (pp. 5-18). Englewood Cliffs, NJ: Educational Technology Publications.

Kinchin, I. (2004). Investigating students' beliefs about their preferred role as learners. *Educational Research, 46*(3), 301-312.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75-86.

Knowles, M. S. (1970). *The modern practice of adult education: Andragogy versus pedagogy*. New York: Association Press.

Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. New York: Association Press.

Knowles, M. S., Holton, E. F., III, & Swanson, R. A. (1998). *The adult learner: The definite classic in adult education and human resource development* (5th ed.). Houston, TX: Gulf Publishing Company.

Kolb, D. (1984). *Experiential learning*. Englewood Cliffs, NJ: Prentice-Hall.

Koschmann, T. (Ed.). (1996). *CSCL: Theory and practice of an emerging paradigm*. Mahwah, NJ: Erlbaum.

Land, S. M. (2000). Cognitive Requirements for Learning with Open-Ended Learning Environments. *Educational Technology Research and Development, 48*(3), 61-78.

Land, S. M., & Hannafin, M. J. (1996). A conceptual framework for the development of theories-in-action with open-ended learning environments. *Educational Technology Research and Development, 44*(3), 37-53.

Land, S. M., & Hannafin, M. J. (1997). Patterns of understanding with open-ended learning environments: A qualitative study. *Educational Technology Research and Development, 45*(2), 47-73.

Land, S. M., & Hannafin, M. J. (2000). Student-centered learning environments. In D. H. Jonassen & S. M. Land (Eds.), *Theoretical foundations of learning environments* (pp. 1-23). Mahwah, NJ: Erlbaum.

Larkin, J. H. (1989). What kind of knowledge transfers? In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 283-305). Hillsdale, NJ: Erlbaum.

Lea, S. J., Stephenson, D., & Troy, J. (2003). Higher education students' attitudes to student-centred learning: beyond 'educational bulimia'? *Studies in Higher Education, 28*(3), 321-334.

LeCompte, M. D., & Goetz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research, 52*(1), 31-60.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education, 27*(1), 27-52.

Mandl, H., Gruber, H., & Renkl, A. (1996). Communities of practice toward expertise: Social foundation of university instruction. In P. B. Baltes & U. M. Staudinger (Eds.), *Interactive minds* (pp. 394-411). New York: Cambridge University.

Marton, F., Dall'alba, G., & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research, 19*, 277-300.

Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I--Outcome and process. *British Journal of Educational Psychology, 46*, 4-11.

Mayer, R. E. (1992). Cognition and instruction: Their historic meeting within educational psychology. *Journal of Educational Psychology, 84*(4), 405-412.

Maykut, P., & Morehouse, R. (1994). *Beginning qualitative research: A philosophic and practical guide*. Bristol, PA: The Falmer Press.

McCombs, B. L., & Whisler, J. S. (1997). *The learner-centered classroom and school: Strategies for increasing student motivation and achievement*. San Francisco: Jossey-Bass Publishers.

McGill, I., & Beaty, L. (1995). *Action learning: A guide for professional, management and educational development* (2nd ed.). London, PA: Kogan Page.

Mclntyre, J., & Grudens-Schuck, N. (2004). Research in adult education and training. In G. Foley (Ed.), *Dimensions of adult learning: Adult education and training in a global era* (pp. 167-186). Berkshire, England: Open University Press.

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.

Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood* (2nd ed.). San Francisco: Jossey-Bass.

Merseth, K. K., & Lacey, C. A. (1993). Weaving stronger fabric: The pedagogical promise of hypermedia and case methods in teacher education. *Teaching and Teacher Education, 9*(3), 283-299.

Meyer, J. H. F., & Muller, M. W. (1990). Evaluating the quality of student learning. I—An unfolding analysis of the association between perceptions of learning context and approaches to studying at an individual level. *Studies in Higher Education, 15*(2), 131-154.

Mezirow, J. (1978). Perspective transformation. *Adult Education, 28*(2), 100-110.

Mezirow, J., & Associates (1991). *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. San Francisco: Jossey-Bass.

Mishra, S. (2002). A design framework for online learning environments. *British Journal of Educational Technology, 33*(4), 493-496.

Morgan, A., & Beaty, L. (1997). The world of the learner. In F. Marton, D. Hounsell & N. J. Entwistle (Eds.), *The experience of learning: Implications for teaching and studying in higher education* (2nd ed., pp. 217-237). Edinburg: Scottish Academic Press.

Munby, H. (1982). The place of teachers' beliefs in research on teacher thinking and decision making, and an alternative methodology. *Instructional Science, 11*(3), 201-225.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*(4), 317-328.

Newble, D., & Clarke, R. (1987). Approaches to learning in a traditional and an innovative medical school. In J. T. E. Richardson, M. W. Eysenck & D. W. Piper (Eds.), *Student learning: Research in education and cognitive psychology* (pp. 39-46). London: SRHE and Open Univeristy Press.

Norman, G. R., & Schmidt, H. G. (1992). The psychological basis of problem-based learning: A review of the evidence. *Academic Medicine, 67*(9), 557-565.

Oliver, K., & Hannafin, M. (2001). Developing and refining mental models in open-ended learning environments: A case study. *Educational Technology Research and Development, 49*(4), 5-32.

Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of Educational Research, 74*(4), 557-576.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332.

Palmer, P. J. (1998). *The courage to teach: Exploring the inner landscape of a teacher's life*. San Francisco: Jossey-Bass.

Patrick, H., & Pintrich, P. R. (2001). Conceptual change in teachers' intuitive conceptions of learning, motivation and instruction: The role of motivational and epistemological beliefs. In B. Torff & R. J. Sternberg (Eds.), *Understanding and teaching the intuitive mind: Student and teacher learning* (pp. 117-143). Mahwah, NJ: Lawrence Erlbaum.

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Paulsen, M. B., & Feldman, K. A. (1999). Student motivation and epistemological beliefs. *New Directions for Teaching & Learning* (78), 17-25.

Pedersen, S., & Liu, M. (2003). Teachers' beliefs about issues in the implementation of a student-centered learning environment. *Educational Technology Research and Development, 51*(2), 57-76.

Perkins, D. N. (1992). What constructivism demands of the learner. In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 161-165). Hillsdale, NJ: Erlbaum.

Perkins, D. N., & Salomon, G. (1988). Teaching for transfer. *Educational Leadership, 46*(1), 22-32.

Perry, W. G., Jr. (1970). *Forms of intellectual and ethical development in the college years: A scheme*. New York: Holt, Rinehart and Winston.

Peshkin, A. (1988). In search of subjectivity—One's own. *Educational Researcher, 17*(7), 17-21.

Pintrich, P. R., Marx, R. W., & Boyle, R. A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63*(2), 167-199.

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*(2), 211-227.

Pratt, D. D. (1992). Conceptions of teaching. *Adult Education Quarterly*, *42*(4), 203-220.

Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. *American Journal of Education, 100*(3), 354-395.

Prosser, M., & Trigwell, K. (1999). *Understanding learning and teaching: The experience in higher education*. Buckingham: SRHE and Open University Press.

Prosser, M., Trigwell, K., & Taylor, P. (1994). A phenomenographic study of academics' conceptions of science learning and teaching. *Learning and Instruction, 4*(3), 217-231.

Pryor, J. B. (1980). Self-reports and behavior. In D. M. Wegner & R. R. Vallacher (Eds.), *The self in social psychology* (pp. 206-228). New York: Oxford University Press.

Ramsden, P. (1979). Student learning and perceptions of the academic environment. *Higher Education, V8*(4), 411-427.

Reeves, T. C., & Okey, J. (1996). Alternative assessment for constructivist learning environments. In B. G. Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design* (pp. 191-202). Englewood Cliffs, NJ: Educational Technology.

Reiser, R. A. (2001). A history of instructional design and technology: Part I: A history of instructional media. *Educational Technology Research and Development, 49*(1), 53-64.

Resnick, L. B. (1987). The 1987 presidential address: Learning in school and out. *Educational Researcher, 16*(9), 13-20.

Richardson, V., Anders, P., Tidwell, D., & Lloyd, C. (1991). The relationship between teachers' beliefs and practices in reading comprehension instruction. *American Educational Research Journal, 28*(3), 559-586.

Riding, R., & Rayner, S. (1998). *Cognitive styles and learning strategies*. London: David Fulton.

Rieber, L. P. (2000). The studio experience: Educational reform in instructional technology. In D. G. Brown (Ed.), *Teaching with technology: Seventy-five professors from eighty universities tell their stories* (pp. 195-196). Bolton, MA: Anker Publishing Company.

Rieber, L. P., Orey, M., & King, J. (2007). *Handbook for the EDIT studio experience at the University of Georgia*. Athens, GA: The University of Georgia, Department of Educational Psychology & Instructional Technology.

Roehler, L. R., & Cantlon, D. J. (1997). Scaffolding: A powerful tool in social constructivist classrooms. In K. Hogan & M. Pressley (Eds.), *Scaffolding student learning: Instructional approaches and issues* (pp. 6-42). Cambridge, MA: Brookline Books.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.

Ryan, M. P. (1984). Monitoring text comprehension: Individual differences in epistemological standards. *Journal of Educational Psychology, 76*(2), 248-258.

Salomon, G., Perkins, D. N., & Globerson, T. (1991). Partners in cognition: Extending human intelligence with intelligent technologies. *Educational Researcher, 20*(3), 2-9.

Samuelowicz, K., & Bain, J. D. (1992). Conceptions of teaching held by academic teachers. *Higher Education, 24*(1), 93-111.

Samuelowicz, K., & Bain, J. D. (2001). Revisiting academics' beliefs about teaching and learning. *Higher Education, 41*(3), 299-325.

Sander, P., Stevenson, K., King, M., & Coates, D. (2000). University students' expectations of teaching. *Studies in Higher Education, 25*(3), 309-323.

Savery, J. R., & Duffy, T. M. (1995). Problem based learning: An instructional model and its constructivist framework. *Educational Technology, 35*(5), 31-38.

Savin-Baden, M. (2000). *Problem-based learning in higher education: Untold stories*. Buckingham, UK: Society for Research in Higher Education and Open University Press.

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In R. K. Sawyer (Ed.), *The cambridge handbook of the learning sciences* (pp. 97-115). New York: Cambridge University Press.

Schank, R. C., Fano, A., Bell, B., & Jona, M. (1993). The design of goal-based scenarios. *Journal of the Learning Sciences, 3*(4), 305.

Schommer-Aikins, M. (2004). Explaining the epistemological belief system: Introducing the embedded systemic model and coordinated research approach. *Educational Psychologist, 39*(1), 19-29.

Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology, 82*(3), 498-504.

Schommer, M. (1993). Epistemological development and academic performance among secondary students. *Journal of Educational Psychology, 85*(3), 406-411.

Schommer, M. (1994). An emerging conceptualization of epistemological beliefs and their role in learning. In R. Garner & P. A. Alexander (Eds.), *Beliefs about text and instruction with text* (pp. 25-40). Hillsdale, NJ: Lawrence Erlbaum Associates.

Schommer, M. (1998). The influence of age and education on epistemological beliefs. *British Journal of Educational Psychology, 68*(4), 551-562.

Schommer, M., Calvert, C., Gariglietti, G., & Bajaj, A. (1997). The development of epistemological beliefs among secondary students: A longitudinal study. *Journal of Educational Psychology, 89*(1), 37-40.

Schommer, M., Crouse, A., & Rhodes, N. (1992). Epistemological beliefs and mathematical text comprehension: Believing it is simple does not make it so. *Journal of Educational Psychology, 84*(4), 435-443.

Schön, D. A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass Publishers.

Schuh, K. L. (2003). Knowledge construction in the learner-centered classroom. *Journal of Educational Psychology, 95*(2), 426-442.

Shambaugh, N., & Magliaro, S. (2001). A reflexive model for teaching instructional design. *Educational Technology Research and Development, 49*(2), 69-92.

Sheppard, C., & Gilbert, J. (1991). Course design, teaching method and student epistemology. *Higher Education, 22*(3), 229-249.

Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of Educational Research, 56*(4), 411-436.

Snow, R. E. (1980). Aptitude, learner control, and adaptive instruction. *Educational Psychologist, 15*(3), 151-158.

Snyder, B. R. (1971). *The hidden curriculum*. New York: Alfred A. Knopf.

Song, L., Hannafin, M., & Hill, J. (2007). Reconciling beliefs and practices in teaching and learning. *Educational Technology Research and Development, 55*(1), 27-50.

Spiro, R. J., & Jehng, J. C. (1990). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In D. Nix & R. Spiro (Eds.), *Cognition, education, and multimedia: Exploring ideas in high technology* (pp. 163-205). Hillsdale, NJ: Lawrence Erlbaum Associates.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.

Trigwell, K., Prosser, M., & Taylor, P. (1994). Qualitative differences in approaches to teaching first year university science. *Higher Education, 27*(1), 75-84.

Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education, 37*(1), 57-70.

Tsai, C.-C. (2000). Relationships between student scientific epistemological beliefs and perceptions of constructivist learning environments. *Educational Research, 42*(2), 193-205.

Tsai, C.-C. (2002). Nested epistemologies: science teachers' beliefs of teaching, learning and science. *International Journal of Science Education, 24*(8), 771-783.

Tynjälä, P. (1999). Towards expert knowledge? A comparison between a constructivist and a traditional learning environment in the university. *International Journal of Educational Research, 31*(5), 357-442.

van Driel, J. H., Bulte, A. M. W., & Verloop, N. (2007). The relationships between teachers' general beliefs about teaching and learning and their domain specific curricular beliefs. *Learning and Instruction, 17*(2), 156-171.

van Driel, J. H., Verloop, N., Inge van Werven, H., & Dekkers, H. (1997). Teachers' craft knowledge and curriculum innovation in higher engineering education. *Higher Education, 34*(1), 105-122.

van Merriënboer, J. J. G., Kirschner, P. A., & Kester, L. (2003). Taking the load off a learner's mind: Instructional design for complex learning. *Educational Psychologist, 38*(1), 5-13.

van Rossum, E. J., Deijkers, R., & Hamer, R. (1985). Students' learning conceptions and their interpretation of significant educational concepts. *Higher Education, 14*(6), 617-641.

van Rossum, E. J., & Schenk, S. M. (1984). The relationship between learning conception, study strategy and learning outcome. *British Journal of Educational Psychology, 54*(1), 73-83.

Vernon, D. T. A., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine, 68*(7), 550-563.

Vygotsky, L. S. (1978). *Mind in society : The development of higher psychological processes* Cambridge: Harvard University Press.

Wallace, R., & Kupperman, J. (1997). *On-line search in the science classroom: Benefits and possibilities*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass.

Whitehead, A. N. (1929). *The aims of education and other essays*. New York: MacMillan.

Williams, S. M. (1992). Putting case-based instruction into context: Examples from legal and medical education. *Journal of the Learning Sciences, 2*(4), 367-427.

Wilson, A. L. (1993). The promise of situated cognition. In S. Merriam (ed.), An Update on Adult Learning Theory. *New Directions for Adult and Continuing Education, 57*, 71-79.

Wilson, B. G. (1996). What is a constructivist learning environment? In B. G. Wilson (Ed.), *Constructivist learning environments* (pp. 3-8). Englewood Cliffs, NJ: Educational Technology Publications.

Windschitl, M. (2002). Framing constructivism in practice as the negotiation of dilemmas: An analysis of the conceptual, pedagogical, cultural, and political challenges facing teachers. *Review of Educational Research, 72*(2), 131-175.

Winn, W. (1990). Some implications of cognitive theory for instructional design. *Instructional Science, 19*(1), 53-69.

Zinn, L. M. (2004). Exploring your philosophical orientation. In M. Galbrith (Ed.), *Adult learning methods: A guide for effective instruction* (3rd ed., pp. 39-74). Malabar, FL: Krieger.

APPENDICES

Appendix A. Survey of Student Information

Please fill in the section below by either filling in the blank space or circling your choice.

1. E-mail: _____
(The e-mail address will only be used for this research study and will be destroyed once it has ended.)

2. Age: _____

3. Gender: Male Female

4. Course: 6190 (first-timer) 6200 6210 6190 (second-timer)

5. Are you: a full time or part time student?

6. What is your major? _____

7. Your program of study:

   Master Specialist Doctoral Non-Degree

8. How many credit hours have you earned in your program of study?

9. Have you taken any other studio classes before?

   Yes (how many credit hours?) No

Appendix B. Permission to Use Epistemological Questionnaire

---

from: Marlene Schommer-Aikins <marlene.schommer-aikins@wichita.edu>
to: Sang Joon Lee <lsj0312@gmail.com>
date: Mar 26, 2007 4:21 PM
subject: Re: Question for Epistemological Questionnaire

Dear Sang Joon,
I am happy to share the questionnaire with you. Please use it with care.

I am sending two files. One contains the questionnaire and much more. The other file is an article that you may find of interest.

Good luck in your work.

Sincerely,

Marlene Schommer-Aikins, Ph.D.
Professor
Educational Psychologist

[redacted]

College of Educ. #123
Wichita State University
Wichita, KS 67260-0123

Appendix C. IRB Approval

Date: Tue 11 Dec 15:48:51 EST 2007
From: "LaRie Sylte" <lsylte@uga.edu>
Subject: IRB Approval- Amendment- Branch
To: "rbranch@uga.edu" <rbranch@uga.edu>
Cc: "SANG JOON LEE" <lsj0312@uga.edu>

PROJECT NUMBER: 2007-10670-0
TITLE OF STUDY: Relationship between Students' Beliefs about Teaching and Learning and Their Perceptions of Student-Centered Learning Environments
PRINCIPAL INVESTIGATOR: Dr. Robert Maribe Branch

Dear Dr. Branch,

Please be informed that the University of Georgia Institutional Review Board (IRB) has reviewed and approved your request for modifications to the above-titled human subjects proposal. It was determined that the amendment request continues to meet the criteria for exempt (administrative) review procedures.

You may now begin to implement the amendment. Your approval packet will be sent via campus mail.

Please be reminded that any changes to this research protocol must receive prior review and approval from the IRB. Any unanticipated problems must be reported to the IRB immediately. The principal investigator is also responsible for maintaining all applicable protocol records (regardless of media type) for at least three (3) years after completion of the study (i.e., copy of approved protocol, raw data, amendments, correspondence, and other pertinent documents). You are requested to notify the Human Subjects Office if your study is completed or terminated.

Good luck with your study, and please feel free to contact us if you have any questions. Please use the IRB number and title in all communications regarding this study.

Thank you,
LaRie
~~~~~~

LaRie Sylte, M.H.A, M.A.
IRB Coordinator
Human Subjects Office
612 Boyd Graduate Studies Research Center
University of Georgia
Athens, GA 30602-7411
Telephone: 706-542-5972
Facsimile: 706-542-3360
http://www.ovpr.uga.edu/hso/
~~~~~~

Appendix D. Sample First Interview Protocol (All)

1. What does teaching mean to you?
2. What is an aim of teaching?
3. What do you think is the teacher's role in learning situations?
4. What do you regard as good teaching?
5. Could you describe an exemplary teacher in your learning experiences?
6. What does learning mean to you?
7. What are desired outcomes of learning?
8. What do you think is the student's role in learning situations?
9. What do you think is effective learning for you?
10. How do different teaching approaches influence your learning?
11. Tell me about your previous learning experiences you feel that you learned best.
12. Tell me about your previous learning experiences you feel that you learned nothing.
13. Why are you taking this course? What is your expectation of this course?
14. What do you think is your role in this course?
15. Have you heard of or experienced student-centered learning?
16. When you hear "student-centered learning environments", what does that mean to you?
17. What do you think is the major difference between teacher-direct instruction and student-centered learning?
18. In which learning environment do you think you can learn better?
19. What are advantages of student-centered learning environments?
20. What are disadvantages of student-centered learning environments?

Appendix E. Sample Mid-Point Interview Protocol (The Beginning *Studio* Students)

1. Could you tell me about overall learning experience in this course?
2. Do you agree that the studio learning environment was supportive of your learning?
3. How are you managing your learning in this course?
4. How are you using the instructor in the course?
5. How are you utilizing resources for your learning in this course?
6. How did you decide your project in this course?
7. What do you believe is effective learning for you?
8. What do you believe is effective teaching for you?
9. What do you believe is the student's role in learning situations?
10. What do you believe is the teacher's role in learning situations?
11. What is your own definition of student-centered learning?
12. Do you believe that this course is a student-centered learning environment?
13. How has this course met your expectation?
14. What do you think are the most factors for successful learning experience in this course?
15. What concerns do you have about this course?
16. What are some of the challenges you experienced if there were any?
17. What changes in your view of student-centered learning, if any, have occurred until now? Tell me about how your views may have changed.
18. What is your current perception of this course?
19. How could this course enhance student learning?
20. Do you agree that you have become more aware of different ways to learn new things?
21. Do you believe that this Studio experiences make you feel more confident about your ability to learning in student-centered learning environments?
22. How are you interested in learning in student-centered learning environments?

Appendix F. Sample Final Interview Protocol (All)

1. Tell me about your overall experiences in this course.
2. How did you manage your learning in this course?
3. How did you use the instructor in the course?
4. How did you utilize resources for your learning in this course?
5. How did you decide and complete your project in this course?
6. What do you think is effective learning for you?
7. What do you think is effective teaching for you?
8. What do you believe is the student's role in learning situations?
9. What do you believe is the teacher's role in learning situations?
10. What is your own definition of student-centered learning?
11. What do you think is the major difference between teacher-direct instruction and student-centered learning?
12. In which learning environment do you think you can learn better?
13. What do you think are advantages of student-centered learning?
14. What concerns do you have about student-centered learning?
15. What do you think are the most factors for successful learning experience in student-centered learning?
16. What are some of the challenges you experienced if there were any?
17. What changes in your view of student-centered learning, if any, have occurred through this course? Tell me about how your views may have changed.
18. What are your overall perceptions of this studio course?
19. Tell me your evaluation of this course.
20. After taking this course, what advice would you give to new students in the studio?

Appendix G. Example of Coding

Data		Codes	Sub-categories	Categories
Q:	Okay, the first question is in your thinking, what does teaching mean to you?			
Julie:	(pauses). As an adult education student, I should have that answer right on the tip of my tongue (laughs). But it is interesting thing, I believe that a lot of education that is done nowadays is not what education is about (laughs). It's not about filling people's heads with things, it's about learning together and empowering people to find what they want to do and what they're gifted at or can be gifted at. It's that exploration together I think that is really education.	Being an adult education student Teaching as learning together Teaching for empowering people to find what they are good at	Positioning Belief about teaching	
Q:	So, what is the aim of teaching?			
Julie:	To empower everyone to contribute to society as best they can and to be as self-fulfilled as they can. I think both of those things together.	Teaching for empowering students to contribute to society and to be self-fulfilled	Belief about teaching	Positioning the Self
Q:	So, to do that, what is a teacher's role in the learning situation?			
Julie:	I think it's very much the role of a mentor, someone who necessarily knows, you know, something more about and has been in the field longer than you have and so has information to give you and hopefully also insight to what they see that you are doing. It's to listen to other person and find out what it is about the subject that interests them and encourage that and provide information for that.	Teacher as a mentor Teacher providing information/insights Teacher interesting and encouraging students	Role of teacher	

Appendix H. Categories, Sub-categories, and Sample Codes

Categories	Sub-categories	Sample codes

Positioning the Self	• Beliefs about teaching and learning
	  o Beliefs about teaching/role of teacher
	  o Beliefs about learning/role of student
	  o Students as active participants
	  o Teachers as facilitators
	• Readiness for self-directed learning
	  o Previous learning experiences
	  o Perceptions of self-directed learning
	• Motivation
	  o Course expectations /interests
	  o Attitude toward learning
	• Self-efficacy about technology
	  o Previous experience using technology
	  o Self-assessment of technical knowledge and skills
		Teachers as a vehicle for knowledge, Teaching as imparting knowledge, Learning as acquisition of knowledge, Teaching for helping people grow, Teachers as guides on the side, Students as active learners, Responsibility for learning, Previous learning experiences, Prior knowledge and skills, Favorites in teaching and learning, Perceptions of self-directed learning, Course expectations/interests, Attitudes to learning, Self-evaluation of technical knowledge and skills, Self-efficacy about learning technology

Perceptions of the *Studio*	• Student-centeredness • Openness • Direction • Support/Guidance • A sense of community • Comfort/Confidence	Students as focal point, Authenticity, Novelty, Motivation/Engagement, Individual differences, Tool/Project selection, Open-ended, Workload, Self-direction, Teacher-directed, Transition, Support/Guidance, Groupworks, Learning community, Comfort, Faculty input, Control of learning, Assessment, Application, Students' responsibility, Feedback, Step-by-step, Communication
Reactions to the *Studio Experience*	• Match • Withdrawal • Conflict • Appreciation • Confirmation • Transformation	Frustration, Satisfaction, Understanding of SCLEs, Building confidence, Possibility of SCLEs, Reinforcement, Negative, Interests in SCLEs, Meeting expectations, Learning outcomes, Difficult, Motivation, Change

Appendix I. Consent Form

I, _____, agree to take part in a research study titled "Exploring Student Beliefs about Teaching and Learning in Relation to Their Perceptions of Student-Centered Learning Environments," which is being conducted by Sang Joon Lee from the Department of Educational Psychology & Instructional Technology at the University of Georgia ( ) under the direction of Dr. Rob Branch, Department of Educational Psychology & Instructional Technology, University of Georgia ( ). My participation is voluntary; I can refuse to participate or stop taking part at any time without giving any reason, and without penalty. I can ask to have information related to me returned to me, removed from the research records, or destroyed.

The reason of the study is to investigate the relationship between students' beliefs about teaching and learning and their perceptions of student-centered learning environments.

If I volunteer to take part in this study, I will be asked to complete **a survey and an epistemological questionnaire** in the class. I understand that, based on the survey and the questionnaire, I will possibly be asked to participate in **two (participants from EDIT 6200 and 6210) or three (participants from EDIT 6190) interviews** via e-mail during the course of the project. The interviews will take place in a quiet room in Aderhold Hall. Each interview will take between **30 to 60 minutes** and will be **audio-recorded**. The interview will be about my beliefs about teaching and learning, my perceptions of student-centered learning environments, and my learning experiences.

After two interviews, I will receive a $20 (participants from EDIT 6200 and 6210) or $30 (participants from EDIT 6190) gift certificate for my participation in the interviews.

The benefits for me are that the research study may help me understand my role in student-centered learning environments and enhance my learning experiences. The researcher also hopes to learn more about the change in beliefs about teaching and learning and their perceptions of learning environments.

The researchers do not foresee any risks to me for participating in this study, nor do they expect that I will experience any discomfort or stress. Participation or no-participation will not affect the participant's grade or status in the class.

The results of this participation will be confidential, and will not be released in any individually identifiable form without prior consent of the participant. Any reports or presentations using information from this study will use pseudonyms.

The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at .

My signature below indicates that the researchers have answered all of my questions to my satisfaction and that I consent to volunteer for this study. I have been given a copy of this form.

Name of Researcher	Signature	Date
Telephone: [redacted] E-mail: lsj0312@uga.edu		

Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu