UNIVERSITY PROFESSORS' PERCEPTIONS ABOUT AUTHENTIC LEARNING IN UNDERGRADUATE TEACHING: A CASE STUDY

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ABSTRACT

In the 21st century employers put a higher value than ever before on the interpersonal and thinking competencies of employees such as skills of teamwork, problem solving, and communication, and the capability of creativity as the most important abilities (A. Herrington & J. Herrington, 2006; Ramsden, 2003). Based on some of these learning theories, J. Herrington and Oliver (2000) further developed an "authentic learning" framework (p. 30). In this study, I referred to their framework to build a rationale for my research design. The elements of critical thinking, problem solving, and collaboration, expressed in this authentic learning framework, are the core concepts in my study.

My past teaching experiences in China sparked my interest in the study because I witnessed an inconsistency between teaching practices in higher education and the needs of students in schools and workplaces. Further, my learning experiences in Canada as a full-time student deepened my research interest. Thus, I devised the purpose of my study to probe the perceptions of professors in the University of Saskatchewan about their philosophies and practices with respect to their undergraduate teaching. I wanted to examine the perceptions of their teaching regarding the authentic learning process in terms of critical thinking, problem solving, and collaboration. My study was a qualitative case study and I used semi-structured interviews to collect the data from six participants with diverse backgrounds from three different disciplines.

I organized the findings of the data in the following categories: Understanding of Authentic Learning (which provides the introduction to understanding the authentic learning process); themes of Context, Diversity of Perspectives, and Relationship; and the special theme of Dina's Belief Construction. There were similarities and variations emerging from the data. The varied backgrounds of participants such as their discipline, class size, teaching level, and administrative position appeared to exert influence on the participants' perceptions of their teaching. Most of the differences occurred within themes of context and relationship. Apart from the pre-existent features, personal belief was another factor that might be seen to have led to some different perceptions.

The data findings provided a foundation to address the level of consistency between the findings and the literature. The discrepancy between my research findings and literature primarily consisted of the conflicting perceptions of teaching practices in relation to collaboration and problem solving. Collaboration was an important area in the literature but the participants' per-

ceptions of their teaching practices concerning collaboration varied. The adoption of technology in the teaching of my participants (e.g., the use of the Internet and video) was an unexpected finding in my study. Most participants described that the blending of technology in their teaching practices reinforced the cultivation of critical thinking, problem solving, and collaboration.

Some implications rendered from the discussions are noteworthy for future research. In the belief construction, Dina (2007) described how implicit and explicit beliefs steered students' thinking, transformed their behaviors, and eventually enhanced students' abilities in critical thinking, problem solving, and collaboration. From the constructivist perspective, Dina and Mary (2007) viewed learning as a process of constructing the understanding of diverse contexts in a community. Some teaching practices described by the participants were the special features of a particular discipline. Technology was a new focus in much of the literature of the past 10 years, which was closely linked with "real life" and "collaboration" nowadays. In addition, I found that each component of authentic learning (i.e., critical thinking, problem solving, and collaboration) deserved further exploration in the future. Although some deficiencies existed, I learned how to design a qualitative case study and these research experiences will become valuable references for my future research.

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CHAPTER ONE: INTRODUCTION

In the 21st century there is a vital need for knowledge and skills that differ from those required in the past. Today's employers are putting a higher value than ever before on the abilities of employees to solve more complex and ill-defined problems (Barnett, 2000). Specifically, they rate interpersonal and thinking competencies such as skills of teamwork, problem solving, communication, and creativity as the most important abilities (A. Herrington & J. Herrington, 2006; Ramsden, 2003). The current framework for teaching and learning in higher education must consequently respond to these new abilities required by new employers in today's society (Barr & Tagg, 1995; University of Saskatchewan, 1998; ACE, 2005).

This need for change interacts with contemporary theories pertaining to teaching and learning in higher education such as a learning paradigm (Barr &Tagg, 1995) and authentic learning environment (J. Herrington & Oliver, 2000). These theories claimed that genuine learning is learning in which both students and teachers are involved, and from which they benefit. Genuine learning considers students' needs first. In a genuine learning process, such skills as critical thinking, problem solving, and collaboration develop from the learning process and may be transferred to real life. My inquiry was about six university professors' perceptions of their undergraduate teaching practices in relation to authentic learning, and whether these professors' perceptions corresponded to "authentic learning" as theorized by J. Herrington and Oliver (2000).

Research Questions

The purpose of my study was to probe the perceptions of professors at the University of Saskatchewan about authentic learning with respect to their undergraduate teaching. My study was guided by the following research questions:

1. In what ways do university professors perceive their undergraduate teaching practices in terms of authentic learning defined as critical thinking, problem solving, and collaboration?

2. How do professors describe their teaching practices to help undergraduate students become critical thinkers, problem solvers and collaborators?

Emergence of Research Questions

My research interest in exploring university professors' perceptions of their undergraduate teaching philosophies and practices in terms of authentic learning emerged from two

sources: my own university teaching experiences and other research I examined. When I was a university lecturer in Chongqing University, China, I was frequently confused by the purpose of and the relationship between teaching and learning activities. My students often questioned me about the significance of their undergraduate learning experiences for their future lives. They suspected that the textbook knowledge and the information acquired through lectures would never be transferred into their daily lives or future workplaces.

The disconnection between the required skills in the workplaces and the knowledge acquired from textbooks or lectures was not an isolated phenomenon among my students, nor was it unique to my university setting. Through conversations with other colleagues from different colleges and universities, I discovered that many educators had doubts about the purpose of learning and teaching in their institutions. Students' concerns, or even worse, their disappointment seemed to convey a message that current undergraduate teaching failed to create a fruitful and genuine learning environment for them. Thus, my previous teaching experiences initially shaped my research interest in authentic learning.

In 2005, I became a graduate student in the College of Education at the University of Saskatchewan. Through my years of academic learning experiences at the University of Saskatchewan, I did believe that genuine learning could exist in academic life and the concept of genuine learning could take hold in university professors' and leaders' minds; however, the traditional "teacher centered" teaching philosophy and practices still seemed to pervade in classrooms. Both of my experiences of being a university teacher and being a student inspired me to pursue the research questions: How do university professors perceive their undergraduate teaching practices in terms of authentic learning (i.e., critical thinking, problem solving, and collaboration)? And, how do professors describe their teaching practices to help undergraduate students become critical thinkers, problem solvers, and collaborators?

Background to the Problem

For decades, teaching and learning have been isolated processes in many colleges and universities. Teachers, university administrators, and students tended to view teaching activities as politically oriented missions and tasks that merely suited the convenience of university administration rather than the needs of student learners (Ramsden, 2003). A common phenomenon in university education has been for students to sit in classrooms as listeners and receivers to await

the instructors to tell them what should be learnt. Ramsden (2003) claimed that "the idea of learning as a dialogue between student and teacher appears to retreat before a tide of bureaucracy" (p. 4).

Aronowitz (2000) criticized university education for ignoring students' priorities and needs in learning activities. The notion of university education as adult learning has a latent connotation that students are supposed to be able to carry on their continuing education by themselves. That is, although the faculty and institution may claim they are accommodating students' needs and interests, the "self-interested individual" is the pervasive subject of today's higher education and students alone have to struggle for the success of their academic lives (p. 142). As a result, many university teachers and administrators feel it is an intrusion to their present duties and scholarship, if they are required to be involved in undergraduate learning activities. Likewise, students often feel that learning simply is their own task that has little relevance to classroom activities (Ramsden, 2003).

However, Barnett (2000), Ramsden (2003), and Herrington and Herrington (2006) contended that the conflicts between teaching and learning become most urgent when one considers the needs of society, workplaces, and students themselves. The learning outcomes produced by many colleges and universities are not in alliance with the requirements of this new century. Further, many researchers propose an idea of teaching for the ultimate purpose of learning. For example, Starratt (1996) argued that the practice of teaching should be involved in the creation of spaces for the development of understanding in student learners rather than the simple transmission of the knowledge among students. In 1995, Barr and Tagg (1995) explicitly presented a new concept of the learning paradigm in higher education. According to Barr and Tagg, a paradigm shift in higher education was happening: a shift from "instruction" in which the primary goal of a college was to provide instruction (or lectures) to "learning" in which the primary goal was to produce and encourage active and positive learning experiences for every student. The reason for this shift was already grounded in the acknowledgement that students vary in their capacity to learn and teachers vary in their capacity to engage students into the authentic learning process.

The significance of these changes was also acknowledged and incorporated in the policy statements of many universities across North America. The American Council on Education (ACE) in their annual report (ACE, 2005) specified concrete learning outcomes and skills that would enable students to become qualified global citizens. In this annual report, eight universi-

ties identified their respective learning goals and skills. Among those goals and skills, knowledge of diversity -- diverse groups of people, cultures, contexts, and histories, interpersonal relations, critical thinking, problem solving under different contexts, and technology skills are the common issues worthy of attention.

Conceptual Framework

Critical thinking, problem solving, and collaboration in authentic learning were the core concepts in my study. Authentic learning embodied the connotation of "cognitive authenticity" rather than "physical authenticity", advocating that learners should possess the autonomy to choose among learning activities. Namely, participation in learning activities should be a result of intrinsic motivation as learners sought for meaning and understanding of the world (A. Herrington & J. Herrington, 2006, p. 3). Cognitive authenticity occurs in the process of learners' interaction in dynamic learning activities, shifting towards the problem-solving process in the real world.

Those three elements were constructively grounded in the relevant learning theories, principally in J. Herrington and Oliver's (2000) authentic learning framework, which guided my design of the interview questions. The framework consisted of the following elements: authentic context, authentic learning activities, access to expert performances and the modeling of processes, multiple roles and perspectives, collaborative construction of knowledge, reflection, articulation, coaching and scaffolding, and authentic assessment (pp.30-31). In their framework, Herrington and Oliver specified three domains in an authentic learning environment: (a) students' learning activities such as collaborative construction of knowledge, reflection, articulation, and multiple roles and perspectives; (b) teachers' roles in coaching and scaffolding, and in assessing students' achievements from learning activities; (c) and authentic activities in authentic context that encompassed ill-defined problems and the access to expert performances and the modeling processes entailing the authentic complexity and reality of life to be completed over a sustained time period. Therefore, Herrington and Oliver's framework could be interpreted as: exposing students to authentic contexts and designing activities, coaching, scaffolding, and assessing students to engage in the process of critical reflection, collaboration, and problem solving. In my study, I did not consider the characteristic of authentic assessment because of limitation of time.

Further, A. Herrington and J. Herrington (2006) presented sufficient examples to justify how authentic learning theory has been carried out in classrooms of diverse subjects, testifying that the authentic learning process is convincingly rewarding. Students gradually learn to enjoy it and develop strong interest in it, although at first they tend to regard the process as difficult. A. Herrington and J. Herrington pointed out that the research and interpersonal skills of students have been considerably refined in authentic learning process. On the other hand, teachers also benefit from this process for they must work with students as facilitators and use their expertise to help students examine and solve problems.

Wolff (1992) expressed the parallel idea with reference to skills that should be cultivated through the teaching and learning process. He perceived the best student learners in universities as "natural participants" who explored the inner selves and the external world around them with alert and probing minds. He advocated that above all, curricular matters should be jointly decided by faculty and students, and should be responsive to students' genuine interests. Second, he believed that the dominant function of higher education learning did not rest only with providing instruction, but with providing an intellectual environment to encourage and enhance learners' autonomy.

Research Method

The nature of my research questions required a qualitative research design. To achieve an intensive examination of the research questions, I used an instrumental case study approach (Gall, Gall, & Borg, 2003). This method is usually adopted to produce detailed descriptions of a phenomenon or to develop possible explanations of it. I conducted this study at the University of Saskatchewan, and examined how university professors perceived their teaching practices in terms of authentic learning (critical thinking, problem solving, and collaboration) in undergraduate classrooms. I conducted this instrumental case study with six individuals. I conducted six individual semi-structured interviews and two follow-up interviews. I used semi-structured individual interviews (Stake, 1995) as a primary strategy, helping to get thick description of professors' perceptions about their teaching practices.

I conducted my study at the University of Saskatchewan and I based the selection of this site on the following understandings. In the twenty-first century, an abundance of accessible information and advanced technology places demands on new generations of university students to

master such personal and social skills as critical thinking, problem-solving, and collaboration. That trend of changes has also been stated in the *Foundational Document on Teaching and Learning* (University of Saskatchewan, 2006) in which the university expressed its concern about how to enhance the relationship between teaching and learning, suggesting that every resource should be used to facilitate authentic learning to be the dominant part of students' learning experience. To achieve such goals, Barnett (2000) argued that universities must utilize resources and set teaching goals to facilitate a learning and teaching process that involves critical thinking and reflection.

Moreover, the characteristics of the University of Saskatchewan made it an appropriate site to conduct my study. First, it had a long history of delivering a wide sphere of courses and programs for students, and it also had a large undergraduate student body (University of Saskatchewan, 1998). Second, the university has clarified its vision and mission to devote every effort to sustain the university's future development as an excellent teaching and research institution in Canada. Third, the University of Saskatchewan has specified strategies to promote authentic learning (University of Saskatchewan, 1998). For example, it advocates that the university will follow international standards to promote teaching and learning. Moreover, the future high-quality undergraduate programs must take students' needs into consideration.

I selected professors from three departments from three colleges: Arts and Science, Pharmacy and Nutrition, and Education. The three departments represent distinct disciplines. I expected multiple teaching cultures and teaching practices from different departments would generate multiple perceptions among teachers in these three areas regarding undergraduate teaching and learning.

I grounded the selection of participants in the acknowledgement that data should be gathered from those participants with special knowledge or perceptions that will offer answers to research questions (Gall, Gall & Borg, 2003, p. 237). I selected participants based on their variety of backgrounds and teaching experiences with undergraduate students. I selected three male and three female professors in the University of Saskatchewan with varying experience in undergraduate teaching. Among the participants, four were tenured professors and two were pre-tenured professors. Two professors were assuming the role of administrators in their own departments.

This study was designed and conducted in accordance with principles set by the Social Sciences and Humanities Research Council of Canada, University of Saskatchewan Advisory Committee on Ethics in Behavioral Sciences Research, and University Council.

Definitions of Terms

Authentic learning, collaboration, critical thinking, and problems solving were essential components of my study. I defined these terms below.

Authentic learning was the process that gives students greater autonomy and control over choice of subject matter, learning methods and pace of study (Herrington & Herrington, 2006). In this study, authentic learning focused on the domains of critical thinking and problem solving skills, and in the process of collaboration between teachers and students.

Collaboration was the mutual engagement of participants in a coordinated effort to solve a problem together (Latz & Lesgold, 1999, cited in Herrington & Herrington, 2006, p.6). Collaboration in this study not only referred to the coordinated work of teachers and students to achieve a common goal of developing skills of critical thinking and problem solving, but it also focused on the mutual interaction among students to accomplish a task or a project in collective and coordinated efforts.

Critical thinking generally addressed practical problems, allowing for doubt and perplexity before possible solutions are reached. Self-criticism of one's actions with a view to improvement was the key. Problem solving was closely linked with critical thinking in that a person is capable of applying the knowledge and theories acquired into real-life contexts.

Problem solving involves goal-directed thinking and action in situations where no ready-made solutions exist. A problem results from the recognition of incongruence between a present imperfect knowledge or thinking and a goal. The problem solving process consists of a sequence of steps. These steps involve problem definition, problem analysis, possible solution-design, solution analysis, solution selection, action plan and implementation.

Real life or *real world* in my study emphasized the societal world as opposed to the academic world; that is to say, a person with experience in real life or the real world has experience beyond book learning. Real world includes places where human beings work or live in their daily life such as in families, communities, and workplaces.

Constructivism in my study emphasized the influence of social factors or phenomena on learners' cognition process. In contrast with objectivism that focused on the knowledge acquisition of an external and objective world, the fundamental point of constructivism was the perspective that cognition is through internalized discourse and through a collaborative process. The purpose of learners' cognitive development is to explore, negotiate, examine, and transform their understandings of and relationships with their inner and outside worlds (Jonassen, 1991).

Assumptions

In designing this study, I assumed that the elements of authentic learning (i.e., critical thinking, problem solving, and collaboration) did exist throughout the process of teaching and learning in undergraduate education. Second, I assumed that students benefit from an authentic learning environment, and that the essential components of authentic learning should remain the same across disciplines. I assumed that both professors and students needed to persistently invest their commitment to build up an authentic learning and teaching environment. Further, I assumed that university professors would provide insights into how undergraduate teaching should correspond to authentic learning. Finally, both the processes of describing their perceptions and that of interpreting their insights occurred within the social constructivist paradigm. Therefore, I developed the theoretical rationale for the study from the perspective of constructivism.

Delimitations

I conducted this study within an authentic learning framework that was constructed on J. Herrington and Oliver's (2000) authentic learning theory. Their theory focused on these attributes: authentic context, authentic learning activities, access to expert performances and the modeling of processes, multiple roles and perspectives, collaborative construction of knowledge, reflection, articulation, coaching and scaffolding, and authentic assessment (pp.30-31). In my study, I placed my interest in three skill domains of authentic learning process: critical thinking, problem solving, and collaboration. The reasons why I paid attention to the only three domains in this study followed.

I believed that critical thinking, problem solving, and collaboration were the synthesis of those attributes presented in Herrington and Oliver's authentic learning theory. That is, critical thinking, problem solving, and collaboration embodied those attributes of Herrington and Oliver's authentic learning theory. Also, within the three skill domains, I examined and discussed all

the attributes of their theory in my study except the attribute authentic assessment because of my research interest.

Consequently, critical thinking, problem solving, and collaboration existed as key components of my research framework throughout this study. I designed my study to describe six university professors' perceptions regarding their undergraduate teaching in relation to authentic learning. The professors came from three different departments in the University of Saskatchewan. Three different departments were selected so that I could examine the phenomenon of authentic learning across various contexts. Participants included tenured professors and pre-tenured professors. And the data thus represented the perspectives of these members in the given research site.

Limitations

I collected the data through semi-structured interviews. The participants' subjectivity and their openness to the interview questions, my bias about and my knowledge of the research questions, my interview skills, and the constraints of time have limited the results of this study.

Further, I conducted the interviews over a four-month period. Thus, the length of the study has provided only a narrow scope of the professors. Second, the size of sample is small. Consequently, the data may not be generalizable to other departments or universities. Also, because the data were limited according to a particular time period, the significance of the data findings is limited.

Significance of Study

In this information age, knowledge has no boundaries and future graduates are expected to become global citizens. In many universities, global citizenship is a vital standard by which to judge student learning outcomes, requiring students to possess particular attributes such as critical thinking, problem-solving, and collaboration. These competencies can not only be applicable to local needs but also to a broader world.

Excellent students' learning is deeply linked with excellent teaching. Teaching methodology and philosophy are conveyed in practice; however, inconsistencies may exist between teaching philosophies and teaching practices. The consistency or discrepancy between professors' teaching philosophies and practices is considerably meaningful to the development of authentic learning experiences.

Accordingly, I conducted this study to interpret the way that university professors perceived their undergraduate teaching practices and philosophies in terms of authentic learning, as it was interpreted by critical thinking, problem solving, and collaboration. In addition, it was of great significance to emphasize that the authentic learning process does not take shape immediately. Rather, intense and ongoing investment in providing opportunities for both teachers and students to expand their capacities in these areas is needed.

Organization of Thesis

The thesis is organized in five chapters. In Chapter One, I introduced the problem for the study. In Chapter Two, I reviewed the existing literature on the development of an authentic teaching and learning environment for students in universities. In Chapter Three, I outlined the research design. In Chapter Four, I presented and analyzed the data collected from the interviews. In Chapter Five, I presented discussions, implications, and reflections of the data findings.

CHAPTER TWO: LITERATURE REVIEW

As the human world stepped in a new Information Age, human learning has been undergoing transformation. As early as in the 1970s, the communications theorist Berlo (1975) identified the need that learning must shift from knowledge acquisition to knowledge processing. He stated:

> For the first time in human history, two related propositions are true. One, it no longer is possible to store within the human brain all of the information that a human needs; we can no longer rely on ourselves as a memory bank. Second, it no longer is necessary to store within the human brain all of the information that humans need; we are obsolet*e* as a memory bank…Education needs to be geared toward the handling of data rather than the accumulation of data. (p. 8)

In the last ten years, the discussion of transformation in higher education has been pervasive among educators, educational researchers, leaders, and policy makers. The demands for new skills and abilities of employees are changing as well. Mezirow (1997) listed the key competencies for the workforce that involve the skill of using technology, the ability to understand a theme from different perspectives, the ability to actively dialogue in collaborative partnership about knowledge construction, the capability of conceptualizing theories through problems, and the transformation of academic knowledge into applications to solve problems. Such competencies convey the implication that today's students will spend all their adult lives in a diverse, multi-tasking, and information-driven world.

The notion of fostering authentic learning experiences for students in higher education has emerged to meet these challenges. Authentic learning in my study highlighted students' critical thinking and problem solving skills in a collaborative team setting, which were fostered through the journey of exploring individuals' meaning, understanding, and interpretation of their world. It was more important that those skills can be transferred across various real- life contexts to cope with real-life problems.

The study was to probe university professors' perceptions of their teaching practices in terms of their promotion of authentic learning. In accordance with the purpose of my research, this chapter consists of two sections. The first section is related to the conceptions of authentic learning; and the second is related to university teaching and learning.

Criteria for the Delimitation of the Literature

My interest in authentic learning emerged from my confusion about the purpose of and the relationship between teaching and learning activities in higher education. My past teaching and learning experiences in more than one university suggested to me that there was a disconnection between required skills in workplaces and the skills acquired from classroom experiences may be a common issue. I wondered whether current undergraduate teaching made learning fruitful and genuine for today's undergraduate students. I believe that genuine learning should exist in academic life; and that critical thinking, problem solving, and collaboration are vital to authentic learning process.

I focused my literature review on the domains of "authentic learning" and "university teaching and learning". I examined the research in books, theses, dissertations, journals, and periodicals, in both hard copies and electronic versions. University of Saskatchewan documents were useful in identifying the university's interpretations of its learning and teaching processes. While researching the literature of the past twenty years, I combined the terms "authentic learning (in) university (classroom)", "critical thinking (in) university classrooms / learning", "problem solving (in) university classrooms / learning", "collaboration (in) university classrooms / learning", "authentic learning / critical thinking / problem solving / collaboration (in) undergraduate classrooms / teaching", "teaching / education / learning (in) higher education", and "university teaching (and) learning" as my search key words.

The initial search results suggested that there were two major strands in the prevailing learning theories of the past twenty years: objectivism and constructivism. Also the search results indicated that theories concerning "authentic learning", "critical thinking", "problem solving", and "collaboration" mostly fell in the strand of constructivism. Due to the constructive attribute of my study, I consequently decided to focus on learning theories from the constructivist perspective rather than the objectivist perspective. Although some literature also referred to "authentic learning", "critical thinking", "problem solving", and "collaboration" in K—12 classrooms, I excluded those discussions from my literature review because my study interest was placed in the context of universities.

A second pertinent literature strand was related to the discussions of the value, purpose, and responsibilities of university education, the employee requirements from current workplaces, the discrepancies between university teaching and required work skills, the concepts for universi-

ty teaching and learning, and the concerns and hopes for current and future university teaching. The listed two reviews indicated that more theories about higher education and university teaching were developed in the UK and Australia than in North America. I found that those theories were mainly related to authentic learning, particularly the development of critical thinking, problem solving, and collaboration in the learning and teaching process with regard to university setings.

Authentic Learning

Authentic learning is the product of constructing a number of learning theories and abstracting from these theories. Based upon J. Herrington and Oliver's (2000) authentic learning environment framework, authentic learning should be understood as a learning environment facilitated by teachers. In this environment, students are sustained to cultivate their interpersonal and thinking competencies of critical reflection, problem solving, and collaboration with others through such learning activities as probing, understanding, and interpreting their relation with the world. In this section I begin with how researchers view learning and how authentic learning theory emerges from these theories. Next, I discussed the framework of authentic learning. In the domain of this authentic learning framework, I discussed three vital components of authentic learning--critical thinking, problem solving and collaboration.

Learning Theories

Starting in the 1950s, the theories concerning learning and thinking have undergone a gradual paradigm shift from objectivism to constructivism. From the objective perspective, learning is the process of acquiring knowledge built the records of earlier human activities. From the constructivist perspective, learning is the process of learners' negotiating and communicating with the world, and interpreting the world as well. Behavioral psychology is firmly rooted in objectivism with the belief that the objective, real world is external to and independent of any human world and activities (Jonassen, 1991). Behaviorists advocate that the learning process of all human beings is to mirror the same reality and the structure of the external world. An implication of objectivism is that the role of education is merely "to help students learn about the real world and replicate its content and structure in their thinking" rather than to construct their personal interpretations (p. 10). If oriented by the above conception, most teaching activities would focus on knowledge transmission that is prescribed by decontextualised subject-matter analysis.

On the other hand, constructivism contended that human beings construct their own understandings through their personal experiences. The most fundamental attribute of constructivism is context. Jonassen (1991) claimed that "learners can only interpret information in the context of their own experiences" and their interpretations will be "individualistic" (p. 11). He stated:

> If our learning theory assumes that we construct meaning for objects and events by interpreting our perceptions of them in terms of our past experiences, beliefs, and biases, then each of us mentally represents our own personal reality. Each reality is somewhat different, because each person's experiences and resulting apperceptions are different. (p. 7)

In view of the difference in individual experiences, Jonassen (1991) suggested that educational institutions and teachers should design real-world environments that "employ the context in which the learning is relevant" to help learners create their own world views by exposing them to multiple perspectives (p. 11). Although most of current learning and teaching activities possess both objective and constructive components, the constructivists hold that the constructivist perspective functions significantly in promoting understanding of how authentic learning (in terms of critical thinking, problem solving, and collaboration) occurs in a social context.

Learning, according to Biggs (1991), is a process which "involves meaning, understanding and a way of interpreting the world" (p. 11). Boyer (1990) in the *Carnegie Foundation for the Advancement of Teaching* favored a holistic perspective of learning. Senge, Scharmer, Jaworski, and Flowers (2005) recognized that human practices and knowledge are changed or created as the ecological and social world changes. Learning thus emerges as a response to these transformations. However, Senge argued that it is an over-simplistic perspective to consider learning merely as responses to new circumstances. It is more important for people to invest their energy in what they do and in their mutual relations in terms of learning. That is, human learning will make its significance only if learners are positively interacting with and shaping their relation with the world around them. Senge et al. (2005) proposed that many learners in their current learning are only reactive learners who learn to react to circumstances without any initiative to change their relationship with the circumstances. Deeper levels of learning should be adopted so that learners could see deeply the larger wholes, and establish effective connections to this wholeness.

Other researchers in the constructivist camp also developed their own learning theories such as D. W. Johnson and F. P. Johnson's (1997) "experiential learning theory"; Mezirow's

(1997), Jacob and Hellstron's (2000), and McGonigal's (2007) "transformative learning theory"; Wenger's (1998) "social learning theory"; Dryden and Vos's (1999) "situated learning theory"; Schuetze and Slowey's (2000) "life-long learning theory"; and Raven & Stephen's (2001) "learning society theory". I described these theories below.

Experiential Learning

D. W. Johnson and F. P. Johnson (1997) perceived experiential learning as a process that incorporates two components, namely, procedural learning and action learning. According to Johnson and Johnson, procedural learning is not merely the learning of facts or the acquisition of knowledge, but, it is a progressive process of knowledge and skill refinement as new knowledge and skills are applied into practice. In addition, the responsibility for learning does not rest with teachers or others but with the learners themselves.

Action learning, on the other hand, attaches importance to every tacit knowledge-based action. Experiential learning is another form of social learning that likewise looks on learning as a process in which human beings develop their skills, knowledge, and understanding of the world through their participation and negotiation with the external and internal environments. In other words, learning occurs when learners are exploring the world and taking an active role in knowledge discovery. Learners in experiential learning are no longer passive recipients and listeners with reference to learning; they are also the producers and designers of their own learning process. Johnson and Johnson in this experiential process highlighted the problem-solving skill, and the maintenance of a harmonious and cooperative relationship.

Transformative Learning

According to Mezirow (1991), learning can be active or passive. Passive learning is lower-level formative learning in which learners learn by rote and comprehend technical knowledge acquired from instructors or textbooks (Mezirow, 1991). Active learning is higher-level transformative learning. In Mezirow's (1997) definition, transformative learning is the process of "effecting change in a frame of reference" (p. 5). In such a learning process, "emancipatory" knowledge is usually "gained through critical self-reflection, as distinct from the knowledge gained from our 'technical' interest in the objective world or our 'practical' interest in social relationships" (1991, p. 87).

In transformative learning, adult learners go through the process of perceiving, questioning, examining, and revising their past experiences; and they eventually form new ones. Further, Jacob and Hellstron (2000) presented a transformative mode of knowledge production, sketching their understanding of learning process in a unique manner. It is referred to as a "transformative mode" because the process of how knowledge is structured and passed on differs qualitatively. Knowledge is produced through a process of continuous negotiation and communication of the needs and interests of all the users, beneficiaries, and stakeholders involved. That is, students, teachers, and other participants involved will combine their academic and practical interests leading to achieving the maximum effectiveness in the pursuit of knowledge. This negotiation and communication process can accommodate the diverse needs of every member involved.

McGonigal (2007) interpreted transformative learning theory as a paradigm shift or perspective transformation. Teachers must apply strategies to guarantee the success of perspective transformation. Above all, teachers should provide a critical event for students to examine their thinking and to discover the limitations in their perspectives. Also, teachers should create opportunities for students to identify the underlying assumptions within their current knowledge domain. Further, teachers should expand the capacity for students to carry out their critical self-reflection to examine their previous assumptions and thinking system. Moreover, teachers should facilitate opportunities for students to test new perspectives through the application of new knowledge and approaches. Among these strategies, McGonigal viewed critical self-reflection of assumptions to be a fundamental element of solving problems collaboratively.

Social Learning

Wenger (1998) held that knowledge is the vital component of learning because the understanding about the nature of knowledge, knowing, and learning is the precondition to comprehend learning. Wenger (1998) viewed learning based on four domains: knowledge, knowing, knowers, and meanings. These four domains connote that the production of social learning theory focuses on engaging individual learner's participation in the practices of social communities, and constructing participants' identities in relation to these communities. Further, he divided the learning process into a stage of "remembering and forgetting" and a stage of "continuity and discontinuity." In the first stage, learners can remember the meanings of their existence and will relate and renegotiate the significance of past events with their new experiences about the world,

although they may have forgotten the concrete existence of past events. In the second stage, learners' participation and production in their learning process will evolve. Learners may find new opportunities or needs and thus will change their interest in future learning. Temporary discontinuity in the learning process takes place as a result. Learners will afterwards step into a new round of participation to discover and produce new experiences through their interplay with the world. In this way, continuity begins again. This cycle is "generation depending on reproduction cycles" as Wenger termed (p. 90). He also pointed out that learning takes the informal form in most cases, which he names "learning in practice". Flowing from this informal process, what people will learn is how to engage themselves in the process of developing or creating experiences and understandings. It is through this informal process that authentic learning motivates the development of human beings.

Situated Learning

Through their study of successful education systems around the world, Dryden and Vos (1999) summarized four learning goals: to enhance self-esteem and personal development; to foster life skills; to master and understand the learning process and the ways of thinking critically; and to improve specific academic, physical, and artistic abilities. These four goals may be paraphrased as the following tasks: first, to learn skills and knowledge about specific subjects; to develop general conceptual skills, personal skills, and attitudes; and to learn to apply acquired theories in other social areas (Dryden & Vos, 1999). The key to successful learning is grounded in the knowledge about learners' unique learning or thinking styles. Dryden and Vos defined this learning as situated learning and pointed out that a situated-learning process should be initiated in accordance with individuals' unique learning styles; however, the authors stressed that there is no learning style superior to the others.

Life-long Learning

Schuetze and Slowey (2000) asserted that Lifelong Learning is the major path to a Learning Society. They depicted life-long learning in terms of three attributes: lifelong, life wide, and motivation to learn. Lifelong Learning implied that people should continue their learning throughout their lives, not only through organized learning in formal educational settings but also through non-formal settings.

Schuetze and Slowey suggested that the attribute lifelong would require the structure and interrelationships between different sectors of an educational system. That is, if a learning process is lifelong, all sources of education, whether formal, informal, or non formal, play an active role in the learner's learning progression that involves assessing and recognizing skills and competencies. The life-wide attribute recognized that learning occurs not only in organized formal settings such as colleges, universities, and training institutions, but also in a variety of informal settings. In a life-wide learning process, it is essential that the development and assessment of knowledge come from informal systems other than formal educational systems.

The component of motivation to learn was grounded in the recognition that the mechanisms to foster the motivation and capacity for "learning-to-learn" should be constructed. Schuetze and Slowey (2000) also stated that the shift of perspective from formal instruction or schooling to Lifelong Learning is a significant shift. The prescribed, sequenced, and rigidly-structured curricula or programs would no longer apply to every individual learner in the same classes and at the same age. Rather, learners themselves determine what is learned, and when, where, and how it is learned. Thus, the learners' autonomy in the selection of their appropriate learning time length, approaches, and contents has become a key point associated with this emphasis on learning and learner-centered programs.

Learning Society

Raven and Stephen (2001) defined learning in a more concise and comprehensive way: authentic learning should connote learning to make one's own observations, to collaborate with one's co-learners and teachers, to clarify one's values, to invent, to initiate action, to monitor the effect of action, to take corrective action, to discover the organizing of work, and to communicate or negotiate with people. However, Raven and Stephen warned that very little competent behavior depends on formal knowledge in the learning process.

Whether radical or neutral, all these constructive learning theories converge on the focus of a particular context and the resulting diverse interpretations of the individual. Although many constructivist advocates (Wenger, 1998, is one exception) failed to attach sufficient importance to collaborative activities in the learning process, there is consensus in the literature that authentic learning usually emerges in a social setting. Moreover, problem-solving and critical thinking

(or critical reflection) are two of a set of learning goals to be achieved through collaboration between students and educators. In this sense, authentic learning is a fundamental concept in those learning processes that leads to effective learning outcomes. The application of such theories in teaching was first suggested by J. Herrington and Oliver (2000). They derived the authentic learning environment framework mainly from situated learning theory. Also, A. Herrington and J. Herrington (2006) developed the authentic learning theory grounded in the framework that I discuss in the following section.

Framework of Authentic Learning

J. Herrington and Oliver (2000) developed several authentic learning design elements that constitute the core of authentic learning theory. The first element is an authentic learning context that should reflect the way knowledge will be used in real social scenarios, that should preserve the complexity of real-life settings, and that should provide sufficient resources to enable sustained examination from a number of different perspectives. The second element is authentic activities. These activities of real-life problems must incorporate a single complex task for students and allow students themselves to define the tasks collaboratively. Access to expert performances and the modeling of processes is another element that involves the access to expert thinking of professionals at diverse levels of expertise, and access to the social setting. Thus students have opportunities to observe and experience how experts or their peers design and complete a task.

The fourth element lies in the support of collaborative construction of knowledge. In general, tasks are designed for a group rather than an individual, and the learning goal is set for whole group achievement. Specifically, J. Herrington and Oliver suggested that classroom tasks should be organized for pairs or small groups in classroom settings. Reflection is another critical element. Herrington and Oliver asserted that reflection encourages the formation of abstractions. Learners have opportunities to compare their thinking with that of experts' through this process. The sixth element is coaching and scaffolding. Teachers will facilitate assistance for more able students to undertake the role of coaching, and only at critical moments will teachers coach students. It is authentic and collaborative learning that will happen through this process.

Further, Laiken (2006) argued that an important characteristic of an authentic learning environment is to engage learners to "develop their own reflective judgment in order to surface assumptions and potentially revise the established world view" (p. 18). Laiken (2006) maintained

that teachers and student learners may continuously strive for congruence between beliefs and behaviors during their journey of creating an authentic learning environment. Also, it was contended that learning itself cannot be designed (Herrington & Oliver, 2000, Laiken). Rather, what people can and should do is to design the environment, institutional structures and other resources to facilitate "goings-on" of authentic learning.

This idea is grounded in the recognition that learning is inherent in human nature, and is an experiential and social process fundamentally (Wenger, 1998). Hence, to create authentic learning, institution leaders and organizers are bound to become learning resource facilitators and coordinators as well. Further, Wenger believed that it is difficult to sketch a concrete and formal structure of learning; whereas, learning does have a structure that is labeled as an "emergent, informal" social structure. The structure of learning is essentially that of "order and chaos" or "stability and adaptability" (Wenger, 1998, p.97). Learners establish some rule or framework of practice, and afterwards new conditions emerge, and then new learning flows. Learning also blossoms when people create new connections with their world.

In this sense, Wenger expanded the concept of Senge's (1990) "learning organization" into a broader entity. The whole human world is a large "learning society", which is the future of tomorrow's learning. Evidently, in the learning society, the fundamental structure is human communication and interaction, or, in the higher order, collaboration within the human learning society, which is why collaboration becomes paramount in the discussions followed. I thus discussed collaboration in the following section.

Collaboration

Wenger (1998) stated that a common phenomenon in human life is to form a group formally or informally, that there is no exception with a learning process. Interpersonal relations are vital components of a group. It was the contention of Sackney and Mitchell (2000) that an effective learning group should incorporate several elements. Above all, group members forge a shared vision, and common understanding and goals to promote the sense of belonging by sharing leadership and encouraging genuine dialogue and critical thinking in the group. Further, the reflective, collaborative, learning-oriented, growth-promoting approaches taken by the group become focused on the solving of problems and perplexities in the teaching and learning process.

Moreover, the atmosphere for an effective team is informal, comfortable, relaxed, trusting, encouraging, risk-taking, and tension free.

D. W. Johnson and F. P. Johnson's (1997) models may be considered as a reference for the achievement of collaboration. One is a "discussion group model" and the other is a "growth and counseling group model." The discussion group usually highlights instructional theory, the role of group coordinators, and the objective curriculum materials. Also, teaching and learning adopts a fit-for-all approach and members fail to develop a worthwhile goal of learning new information, knowledge and skills. A growth and counseling group focuses on the higher hierarchy of needs of group members. The themes of this group are to promote psychological welfare, healthy human relations, potential for diverse culture, a sense of belonging, an atmosphere of mutual respect, trust, interpersonal skills, various insights, and honest feedback (D. W. Johnson & F. P. Johnson, 1997). It not only requires a high extent of commitment of all members to the success of the group but places the same high demand on group leaders to create conditions for the transformation through becoming a resource expert.

The development of a collaborative team is achieved basically through communication. Based upon the definition of collaborative cultures (Owens & Valesky, 2007), collaboration is presented as an environment within which educators and learners are empowered and engaged in collective reflective practices and collective learning to solve problems occurring in the teaching and learning context. This collaboration may occur at multi-levels—among students themselves, among fellow teachers, and, between students and teachers. Collaboration will boost the development of reflection and articulation of ideas and knowledge, and enable more flexible roles to be assumed by students and teachers so as to achieve more desirable learning outcomes.

In brief, collaboration can be best achieved through collective tasks that will evidently go beyond the capacity of a single student if learners could work as a part of a team. What puts collaboration at the core of authentic learning is driven by the recognition that in many universities, undergraduate education has typically promoted "individual endeavor and cognition rather than collaboration" so much so that students' learning activities are largely "solitary" even though technology may enable collaboration (A. Herrington & J. Herrington, 2006, p. 6).

However, it is notable that ideas or knowledge will reach their maximum value through the processes of collaborative articulation and reflection. Collaborative articulation means that senders of knowledge make their ideas known to the public by various ways such as forums,

classes, conferences, and the Internet; and in turn the receivers of knowledge justify what they receive and offer their input. In order to facilitate the process of articulation, students and teachers are supposed to undertake multiple roles in the activities. For example, more able students can mentor, coach and scaffold their peers; and teachers can organize, manage, support, guide students' learning tasks, and provided available resources needed by students. In these cases, a genuine dialogue and an effective two-way reflection process develop between information senders and receivers. A. Herrington and J. Herrington (2006) suggested an approach that will optimize the outcome of reflection and articulation process. If student learners have access to expert performances and opinions, namely, how real practitioners behave in a real situation, they will definitely be able to compare themselves with experts.

In my literature review, I was also aware of the problems that may hamper teachers' and students' authentic engagement in collaboration. Although Wenger (1998), Johnson and Johnson (1997), and Sackney and Mitchelle (2000) presented an ideal picture of collaboration, the structures facilitating teaching and learning activities in higher education institutions often separate educators from students in real life. For teachers, time is a key issue. Teachers may be willing to spend time on how to improve their practical teaching rather than a superficial theory of "collaboration" (Ramsden, 2003). Also, subcultures and the nature of assignments sometimes determine the narrow scope of "cooperation" among teachers. Teachers tend to share their concerns and responsibilities with their colleagues who have similar assignments; and they will develop their unique culture and language within the small group. On the other hand, even if outsiders are willing to join the group, they are usually hindered by the "jargon" and alien culture shared only among the group members. Thus, the lack of familiarity with other members creates isolation that may arouse miscommunication, misunderstandings, and cross-purposes (Sackney & Mitchell, 2000).

Based on the above context, problems hindering collaboration become more visible. First, the nature of the curriculum and the tasks assigned often determines the isolation in students' learning process. Second, since teachers themselves are not situated in a collaborative culture, how can they encourage their students to collaborate with each other? In short, the core of "collaboration" lies in the creation of multi-level communication among students, students and professional faculty members.

With regard to collaboration as a pedagogical teaching method, much of the literature tends to focus on technology education. Many authors described how to build up collaboration or a collaborative community via internet or technology-based projects, which implies that collaboration in the eyes of contemporary educators should encompass more than conventional classroom teaching.

Critical Thinking and Problem Solving

Critical thinking and problem solving are coordinate skills with collaboration. Such skills can be optimized in collaboration among group members. Students will define and work out the solutions to problems through self-reflection in groups. Mezirow (1991) interpreted the relation between critical thinking and collaboration in learning as "a collaborative learner who is critically self-reflective and encourages others to consider alternative perspectives…" (p. 206).

Critical thinking can be interpreted as a learning skill acquired through the process that teachers will encourage students to examine and question their inner thoughts when they form a belief or decision or transfer the belief or decision into action. The critical thinking process involves self-reflection, the questioning of assumptions, and the interpreting of information from either academic or social life experiences through multiple angles (West, 2007). As identified by Ramsden (2003), inadequate course design is a pitfall in university education. Delivering in fragmented modules and sections, many courses are comprised of a pre-determined, discipline-specific content, and constrained, well-structured solutions to problems that seldom allow students to explore alternative perspectives and approaches to examine problems.

In an authentic learning environment, students develop their own thinking critically through the exploration of diverse perspectives and approaches to a particular problem. Mezirow (1991) viewed critical reflection as the main passage to transformative learning, in which learners will "look critically at their beliefs and behaviors" to gain insights into and new perspectives of their perceptions (p.197). A. Herrington and J. Herrington (2006) suggested that institution leaders and teachers should create a learning environment to encourage students to question their own thinking. They also suggested that teachers may design discrepancies between students' pre-existing experiences and new information. In order to achieve the goal, the learning climate must be open, supportive, relaxing, and encouraging.

West (2007) further questioned whether it is over simplistic to claim that the major task of fostering critical thinking is to engage students in asking questions or in dialogues. She argued that "teaching for critical thinking should be a multi-faceted approach that gives students opportunities to reflect and practice critical thinking and to be assessed and graded on these skills" (p. 7). This approach is one of the factors leading to authentic learning. Pilling-Cormick (1997) expressed a similar belief that critical reflection is in every dimension of the learning process. Not only learners, but also educators, transform their assumptions about learning needs, knowledge, and skills through reflection. Through the journey of exploring multiple points of view, and examining the current knowledge system, students and teachers may discover teaching approaches that effectively address distinctive students' learning needs. In all the learning theories discussed above, there is a common belief that critical thinking is a vital component of a learning process and authentic learning will not happen without critical thinking. However, West (2007) also cautioned that teachers should be alert that conflicts or strong feelings may occur during the process of fostering critical thinking. Hence it is important for teachers to set guidelines for classroom conduct to convey a message that students' perspectives are truly valued.

Problem-solving is another skill. All constructive learning theories have emphasized the importance of engaging students in complex, ill-structured problem solving tasks, which are intended to help students see the meaningfulness and relevance of what they learn and to facilitate transfer by contextualizing knowledge in authentic situations. Yet previous research has pointed to student deficiencies in problem solving, for instance, a failure to apply knowledge from one context to another (Jonassen, 2000), especially when solving ill-structured problems. Jonassen also indicated that most problems students encountered in their curricula were well-structured ones that will be "inconsistent with the nature of the problems they will need to learn to solve in their everyday lives" (p. 63).

According to Vygotsky (1978), learners should be guided or scaffolded by a "more capable peer" to solve a problem or carry out a task that would be beyond what they could accomplish independently (p. 86). The notion of scaffolding has traditionally emphasized the role of dialogue and social interaction to foster comprehension-monitoring strategies; however, externalized support during problem solving has also been accomplished through strategies such as modeling, prompting, and guided, student-generated questioning. Such strategies have been

found to be effective in fostering comprehension, monitoring, problem solving, and reflective thinking (A. Herrington & J. Herrington, 2006).

Ill-structured problems have vaguely defined or unclear goals, and the information needed to solve them is not entirely contained in the problem statements. A problem qualifies as ill defined if any one of the three components (an initial state, operators, and a goal state) is not well specified. If ill-structured problems are defined as having vague goals that permit multiple solutions or solution paths, as a contrast, well-structured problems have single solutions, optimal solution paths, and structured goals. Solving well-structured problems normally involves representing the problem, searching for solutions, and implementing solutions. However, because of the nature of an ill-structured problem, its solution process is different from that of a well-structured problem. Problem representation, justification skills, monitoring, and evaluation are the primary requirements for ill-structured problem solving (Jonassen, 2000).

To cultivate this skill, teachers should deliberately expose students to diverse problematic environments. In problematic environments, students do not have a handy answer to the tasks designed by teachers. Cognitive psychology has shown that problem-solving activity comprises four steps: problem recognition and analysis, planning and strategy selection, strategy application, and evaluation (Lawson, 1991, p.134). A. Herrington and J. Herrington (2006) advocated that learning activities students are engaged in or tasks they perform should comprise a realistic problem that presents the complexity of real life and that should be tackled over a sustained period of time so that students will gradually develop a genuine skill of solving problems across their real-world situations. A. Herrington and J. Herrington criticized the courses and the teaching and learning activities designed in many universities. They suggested that many university courses and learning activities were fragmented and de-contextualized because university courses and learning activities were too often well-defined and were simply adapted to the settings of classrooms rather than to real-world contexts.

Summary of Authentic Learning

In the previous section, I presented learning theories regarding authentic learning, in which students under the guidance of teachers can be sustained to cultivate their interpersonal and thinking competencies of critical reflection, problem solving, and collaboration. Such competencies are usually promoted through students' learning activities of seeking, interpreting, and

constructing actual experiences within the real world. In this authentic learning process, the skills of critical thinking and problem solving in a collaborative group are highlighted in the literature. Authentic learning and its embodiment of critical thinking, problem solving, and collaboration are requisites for university teaching and learning in the 21st century. If authentic learning is to be achieved, the teaching and learning processes in a university should also be reconceptualized. In the next section, I discussed theories regarding university teaching and learning.

University Teaching and Learning

Since my study focused on university professors' perceptions of the relation between their teaching and undergraduate students' learning, it was essential to review the research literature to discover the fundamental concepts of constructing university teaching and learning. This section includes the context of university education, and the reconstruction of teaching and learning. In "Context of University Education", I discuss the responsibilities of university education and underlying conceptions or perceptions of university life. In "Reconstruction of Teaching and Learning", I discuss the gap between traditional teaching goals and current learning needs, the shift in conception of teaching and learning from an "instruction paradigm" to a "learning paradigm", and some strategies to address this transformation in teaching and learning.

Context of University Education

For a long time, researchers with an interest in higher education have been investigating the value-laden issues that cast light on learning and teaching matters within universities. Wolff (1992) grounded his arguments in the following interpretations of university education. Nowadays the best students in universities are those "natural participants" who explore their inner selves and the external world around them with alert and inquiring minds. To a great extent, the process of establishing them as natural participants is shaped by their engagement in the larger world. Moreover, education in universities is supposed to liberate students' capacity of probing and interpreting. Students in their learning are prompted to reexamine and reflect on the religious, moral, social, economic, and political issues or traditions in the human world.

Wolff (1992) further suggested that the ideal university is a learning community that has intensive collaboration and is devoted to the preservation and advancement of knowledge, the exploration of truth, and the improvement and development of human social and intellectual well-being. However, the dynamics and effectiveness of a university can be preserved only

through a set of shared interests, needs, decision-making, goals, and expectations; through communication among the learners and teachers; and through support and resources to sustain the development of a healthy learning community. Wolff stressed the importance of unanimous agreement on the purposes of the university community when referring to the concrete issues of teaching and learning. He advocated that curricular matters should be jointly decided by faculty and students with flexible changes in response to genuine student interest.

Pelikan (1992) optimistically conceptualized the duties of universities as the ground of promise for the future, and the place to spread revolutionary doctrines and initiate self-reformation. To be specific, the ultimate aim of universities is the promotion and enhancement of individuals' mental capacities of quality service through excellence in research, teaching, and learning. In the 20th century, numerous critical and thoughtful intellectuals criticized the University for being an ivory tower because university education merely served academic excellence that had little relevance to actual social realities and problems. In this case, the responsibility of education in universities with respect to the spread of revolutionary doctrines lies in their role as a primary provider of intellectual, philosophical, cultural tradition, and knowledge for students by exposing students to deep and critical reflection on the nature of human well-being and society. The purpose is to develop students' skills and world view, and equip them with methods to analyze and establish connections between theories and social realities. There is another doctrine that says the university should invent new ways to integrate the disparate areas of research, teaching, and learning into a sustainable entirety (Pelikan, 1992).

Barnett (2000) asserted that changes in the nature of knowledge and in the policy context are bound to spur holistic transformation in higher education. All the problems and challenges emerging in the literature pointed to the common theme that educators need to reconsider. This theme is that education delivered by universities must facilitate teaching and learning to cope with uncertainty and super complexity in the light of new information.

University education also evolves in the ever-changing world. If the primary responsibility of university education is to deliver tradition and knowledge for students by engaging them in the authentic learning process, it is time for university leaders, teachers, and students to redefine the relation between teaching practices and authentic learning. To be more specific, the relation between teaching practices and the fostering of critical thinking, problem solving, and collaboration deserves examination from different perspectives.

Reconstruction of Teaching and Learning

Nowadays, universities and colleges are in the tide of transformations. In addition to the changes stated in the beginning of this chapter, the Association of American Colleges and Universities (AAC&U) in the major initiative of *Greater Expectation* (2002) also identified a set of factors that constrain the 21st century universities and colleges. First, students' learning outcomes have been under criticism. As post-secondary schools move to mass higher education, student performance is faltering in spite of increasing college enrollment. Barnett (2000), Ramsden (2003), and A. Herrington and J. Herrington (2006) contended that the conflicts become visible between the real needs of society, workplaces, and students and the way colleges produce learning and teaching. To a degree, the learning outcomes of some universities are not in alliance with the requirements of this new century. Also, the huge student body brings in significant new demands for varied knowledge and skills. Furthermore, new technology places the challenge of transformation in teaching and learning approaches on the shoulder of universities.

University teachers are expected to design courses and teaching methods to suit different groups of students and mixed-ability classes; to apply information and communication technology appropriately; to inspire students; to fulfill new administrative demands, and to show accountability to a variety of masters as both teacher and scholar (Ramsden, 2003). The roles of students are expected to be transformed as well. In the past, students could reproduce memorized textbook knowledge while not fully understanding their subjects in a way to solve real problems. In the 21st century, new accessible information and advanced technology place demands on this generation of university students so much so that they must master critical thinking, problem-solving and collaboration skills.

Aronowitz (2000) clarified his concerns about current undergraduate education. Colleges are training students to enter a profession, but they rarely focus on students' own priorities and interests. The *Second Integrated Planning Cycle* (2007) document from the University of Saskatchewan recognized that there was a gap between the current teaching and learning environment and the experiences and the actual learning needs of students. The quality of teaching was inconsistent with the "teaching methodologies or practices utilized by some professors" (University of Saskatchewan, 2007, p. 6.) There were rare instances of "higher" learning in university contexts, which means that students "not only acquire new skills and information, but also transform their approach to thinking and learning" (McGonigal, 2007, p. 3). The term of

"mission differentiation" occurred as a tacit acknowledgment that "liberal education" was not suitable for everyone. Colleges have to define their own role according to their own unique contexts. As a consequence, student learners are beginning to map their own learning needs and determine their own learning priorities.

Two questions still remain for today's higher education institutions. Does the academic system have a genuine role in providing the space for learning? Does current teaching enable authentic learning? Excellent learning is closely linked with excellent teaching, which implies changes in the conceptions and theories of teaching as they are expressed in practice. Essentially, these conceptions and theories are expressed in teachers' experiences of teaching and conducting through activities in the classroom; in the design and implementation of educational programs; in teamwork with colleagues; and even in the management of academic departments and universities. Mezirow (1991) advocated that both teachers and students should share the responsibility of learning. Teachers should facilitate authentic learning by working with students to help them sharpen their awareness of assumptions, and to reflect on and challenge their beliefs. In a similar vein, students should be involved in action planning through their participation in discourse, and they should be empowered in decision making or design of the learning activities (Mezirow, 1991). Mezirow claimd that "participation in rational discourse will help (students) … arrive at more developmentally advanced meaning perspectives" (p. 78).

As identified by Pelikan (1992), one of the characteristics of socially constructed knowledge is that there is a full range of learning opportunities and a diverse set of learning outcomes. Several strategies are also specified to foster and enhance collective learning. One strategy is the reflective practice that takes place at both the individual and collective level. That is, teachers should not only be ready to challenge their own instructional practices, habits, beliefs, and assumptions, but also to engage in critical discourse with colleagues to understand and explore how and what they learn and to apply their knowledge in novel situations (Sackney & Mitchell, 2000). This reflection process should also be applied to students' learning experience.

The *University of Saskatchewan Mission Statement* (1993) advocated that "the university's graduates will be adaptable to rapid change and be competitive with their peers around the world" by valuing creativity, intellectual curiosity, innovation, critical thinking, and knowledge (University of Saskatchewan, 2001). The Association of American Colleges and Universities (AAC&U) in the *Greater Expectations* (2002), and Barr and Tagg (1995) expressed similar con-

cepts of transforming university teaching and learning from the traditional disciplinary knowledge store to a new knowledge, research, and development network university (Jacob & Hellstron, 2000).

Barr and Tagg (1995) presented the concept of a learning paradigm in higher education. According to Barr and Tagg, a paradigm shift in higher education was bound to happen: a shift from "instruction" in which a college's goal is mainly to provide instruction (or lectures), to "learning" in which the goal is mainly to produce and encourage active and positive learning with every student. Barr and Tagg elaborated how the two paradigms differ according to six dimensions: mission and purpose, criteria for success, teaching and learning structures, learning theory, productivity and funding, and nature of roles.

The reasons for this shift were already grounded in the acknowledgement that students vary in their capacity to learn, teachers vary in their capacity to engage students in the authentic learning process, and administrators vary in their capacity to facilitate teaching and learning. In a similar way, many researchers proposed an idea of "teaching for the ultimate purpose of learning". For example, Boyer (1990) suggested the scholarship of teaching, in which well-informed teachers will use a carefully-planned teaching process to sustain and encourage active learning involving the enhancement of students' critical thinking and collaborative problem solving skills. In Boyer's scholarship of teaching, both students and teachers are learners. Starratt (1996) argued that the practice of teaching should be involved in the creation of capacity for the development of understanding in student learners rather than the simple transmission of the best answers among students.

McGonigal (2007) expressed the same understanding in another way. He held that to achieve optimal learning, students with the assistance of teachers should first recognize the limitations of their current knowledge system. This recognition would go through means of interpreting information or experiences from textbooks, real life context rather than accepting the single, pre-approved "correct" answers without questioning. Furthermore, teachers should take the responsibility to maintain a harmonious relationship between themselves and students. At the same time, risk taking in pursuit of new approaches to problem solving should be encouraged. The American Council on Education (ACE) in their annual report (2005) specified concrete learning outcomes and skills that enable students to become qualified global citizens. ACE focused on the following skills in this report: knowledge of diversity—diverse groups of people, cultures, con-

text, and histories, interpersonal relations, critical thinking, problem solving under different contexts, and technology skills.

At the University of Saskatchewan, the idea of reconceptualising the relationship between teaching and learning was included in the agenda. In the *Foundational Document on Teaching and Learning* (University of Saskatchewan, 2006), the university reaffirmed its commitment to enhancing the relationship between teaching and learning, and the commitment to facilitate the technological, infrastructural, and other supports of opportunities to enable authentic learning experiences to take place. The university also specified its principles for the future development of teaching and learning. Faculty and students were to have the freedom to "choose their own problems for study and research, adopt their own methodologies, and make their own mistakes without interference from inside or outside the university" (University of Saskatchewan, 2006, p. 34). The goals of freedom of inquiry and of fostering the teacher-scholar model were advocated. Teaching was conceptualized as more of "the creation of a capacity for criticism and self-examination" (University of Saskatchewan, 1998, p. 5).

Moreover, strategies have been identified to address the transformation in teaching and learning concepts. Most of the policies demonstrated a theme that university-wide teaching and learning were to be transformed with initiatives. Transformations in teaching and university were expected to meet international standards and new demands from students and society, and ultimately to prepare students for success in the knowledge age.

It was indicated that students' success and development in both academic and social life would be substantially enhanced if they have "strong affinity" for their learning experiences (University of Saskatchewan, 2007, p. 6). Several strategies of enhancing the student experience were presented. According to what was stated in the Second Planning Cycle, the University of Saskatchewan will assist professors in pedagogical instruction, provide mentoring for them, and document teaching portfolios systematically to "ensure good teaching habits and practices are established" (University of Saskatchewan, 2007, p. 6). Given this directive it is important to determine how professors perceived and engaged themselves in authentic learning strategies.

Out-of-class experiential learning is a vital component of enhancing the student experience. The University of Saskatchewan (2007) has a tradition of valuing community service learning opportunities for students. This strategy addresses problem-solving approaches in real social life under the modeling of experts. Technology is another important tool in enhancing stu-

dent learning experiences. As claimed in the document, "for this generation of students, technology is a given, a basic requirement and an ongoing necessity" and more significantly, technology provides more learning opportunities and access to multiple perspectives and tremendous information (p. 7). To a degree, technology enables students to view the real world through multiple perspectives by means of their own interpretation, reflection, and construction of knowledge that they acquire.

Summary of University Teaching and Learning

According to the literature review in this section, the goals of teaching are being re-conceptualized for the purpose of educating students to be active learners, critical thinkers, and problem solvers; to enable students to plan their own thinking processes and approaches to learning more independently; and to foster an authentic environment in which students can work collaboratively. In the knowledge-based pluralistic world, if universities are to excel, the relationship between teaching and learning is to be transformed. Both teachers and students are to be involved in redesigning and redefining their roles in the learning and teaching process. Teachers and students are to be co-designers of learning methods and environments. Goals are to be mutually set to foster and enhance critical reflection and problem solving skills and abilities in students.

Summary of Literature Review

In summary, when considering the relation between learning and teaching in higher education, current researchers have arrived at the shared recognition that authentic learning should be constructed as a process of collective and collaborative exploration, participation, and interpretation of the world, and should be focusing on the development of students' critical thinking and problem solving skills. Such authentic learning does not take shape automatically. Rather, intense and ongoing investment is needed in team development by providing opportunities for members to expand their capacities to work well. As suggested in the literature, learning happens in a particular context and it interacts with the context. Thus learning not only requires transmission and absorption through a separately conceptualized teaching process, but it also demands acquisition from the collaborative process of communication and negotiation.

Barnett (2000) argued that universities should utilize resources, plan, and set goals to aid the learning and teaching process that involves collaborative problem solving and critical reflec-

tion. Once the concept of authentic learning is valued and encouraged in university education, then it follows that teaching and learning activities should be carried out in line with the learners' interests and needs. This statement is where the significance of my study lies by exploring how university professors facilitate teaching for authentic undergraduate learning.

CHAPTER THREE METHODOLOGY

In this chapter, I describe the method that was employed in the study of university professors' perceptions of their undergraduate teaching practices regarding authentic learning. The chapter is organized around these sections: Research Design and Rationale, Conceptual Framework, Research Methods, and Ethical Considerations.

Research Design and Rationale

The primary purpose of my study was to gain insight into professors' perceptions about authentic learning in their undergraduate teaching at the University of Saskatchewan. The principal research method adopted in my study was a case study.

The following research questions guided my research process:

1. In what ways do university professors perceive their undergraduate teaching practices in terms of authentic learning that is defined as critical thinking, problem solving, and collaboration?

2. How do professors describe their teaching practices to help undergraduate students become critical thinkers, problem solvers, and collaborators?

The collected data were descriptive in nature and were analyzed by using the combination model developed from Hatch's (2002) interpretive model and Hancock and Algozzine's (2006) stage model.

Conceptual Framework

Critical thinking, problem solving, and collaboration in authentic learning were the core concepts in my study. Principally, J. Herrington and Oliver's (2000) "authentic learning" framework guided my design of interview questions. I referred to the following characteristics of their framework to build a rationale for my research design: authentic context, authentic learning activities, access to expert performances and the modeling of processes, multiple roles and perspectives, collaborative construction of knowledge, reflection, articulation, coaching and scaffolding (Herrington & Oliver, 2000, pp. 30-31). Authentic learning was taken to mean the process that engages students in the exploration and interpretation of the world; and it encourages students to develop their critical thinking and problem solving skills in a collaborative group. The authentic learning process can be elaborated as: teachers coach and scaffold students to foster critical

thinking, problem solving, and collaboration skills throughout the authentic learning activities in the authentic learning context (which in general is facilitated by teachers).

An authentic learning context is an environment that faithfully reflects the way the knowledge is to be used in real life, maintaining the complex relation of real-life problems. In an authentic learning context, students learn to define problems on their own through authentic activities that must incorporate the elements of complexity and group work into the learning tasks designed for students. Access to expert performances and the modeling of processes implies that teachers would expose students to the way experts or other learning partners behave or think when dealing with a task in real life.

The fourth element lies in the support of collaborative construction of knowledge. Teachers should design tasks and learning goals for a group rather than for individual students to ensure that students will mentor each other in collaborative groups. Reflection is another critical element. Students should have opportunities to challenge their past knowledge and values, then discover and construct new perceptions by comparing their thinking with that of experts, and finally learn to transfer acquired theories into practices. The last element is the coaching and scaffolding process in which teachers assume multiple roles to assist students' learning.

Through the constructive perspectives of the authentic learning theory stated above, I examined professors' perceptions of their teaching practices to enhance undergraduate students' critical thinking, problem-solving skills and this ability to collaborate with others. The specific connotations of authentic learning theory also identified the principles of how to design the research to discover and to understand the case.

The research was designed from a constructivist perspective. The idea of constructivism held by most contemporary qualitative researchers is that knowledge is constructed rather than discovered (Stake, 1995). According to Flick (2004), constructivists held the position that:

> Our access to the world of experience – the natural and social environment and the experiences and activities it contains – operates through the concepts constructed by the perceiving subject and the knowledge deriving from these. (p. 90)

I interpreted the teaching and learning experiences based on the data collected from the semi-structured interviews by exploring University of Saskatchewan professors' perceptions of their own teaching practices related to authentic learning within undergraduate teaching.

Research Methods

With respect to constructivism, the inquiry aim of the research design was to understand and reconstruct the world. In this paradigm, the researcher is a "passionate participant" who facilitates the perspectives of the other participants (Denzin & Lincoln, 2005, p. 194). Further, the information to be obtained from the research is "local and specific co-constructed realities" (p. 195). The approach of studying the information obtained from the research is to co-construct interpretations (Denzin & Lincoln).

An instrumental case study approach was used in my study (M. D. Gall, J. P. Gall, & Borg, 2003). This method is usually adopted to produce detailed descriptions of a phenomenon or to develop possible explanations of that phenomenon. A case study not only focuses on specific instances but also is an in-depth study of the case. The study of the phenomenon is conducted in the natural context of the phenomenon and the study allows the "emic-perspective of case study participants" (Gall, Gall, & Borg, 2003, p. 436).

The strength of a case study is that it allows readers and researchers to obtain insightful interpretations of the phenomena. In my study, I could explore the perceptions of university professors regarding authentic learning in their undergraduate teaching. In this section, I explain how the site and participants were selected, and how the data were collected and analyzed.

Site Selection

The case study was conducted at the University of Saskatchewan, which I selected for the following reasons. First, as a primarily undergraduate teaching institution founded in 1907, the University of Saskatchewan has evolved into "a major research university offering one of the broadest ranges of graduate and professional programs in Canada" (University of Saskatchewan, 1998, p. 1). To promote the future development, the University of Saskatchewan advocated that all stakeholders should devote every effort in providing a framework for action that will ensure the future development of the University as an excellent teaching and learning institution. The University specified its principles for the future development: (a) faculty and students have the freedom to "choose their own problems for study and research, adopt their own methodologies, and make their own mistakes without interference from inside or outside the University;" (University of Saskatchewan, 1998, p. 3); (b) and its goals of freedom of inquiry and of fostering the

teacher-scholar model in which it advocated that teaching is more of "the creation of a capacity for criticism and self-examination" (University of Saskatchewan, 1998, p. 5).

In addition, in the *Foundational Document on Teaching and Learning* (University of Saskatchewan, 2006), the university paid attention to the relationship between teaching and learning, particularly, to the technological, infrastructural and other supports or opportunities that will facilitate experiential learning for students. Second, there is a large on-going undergraduate student body in the University of Saskatchewan. According to *2005-2006 Annual Report*, in the six years, the population of undergraduate students remains above 16,600. In 2003-04, the population reached the highest of the six years: 16,993. In 2005-06, there were 16,620 undergraduate students enrolled at the University (University of Saskatchewan, 2006, p. 8). Additionally, undergraduate students occupy the larger proportion of total student population, and undergraduate teaching is a critical factor that predicates the success and the future of the scholarship of researching and teaching.

I selected three departments at the University of Saskatchewan: the College of Arts and Science, the College of Pharmacy and Nutrition, and the College of Education. These three departments were selected because I assumed that the particulars of their disciplines may yield differences in teaching dynamics, culture, and philosophy. This variation was important in order to obtain multivocality of professors' perceptions of the relation between their teaching and undergraduate students' learning.

Selection of Participants

The selection of informants in qualitative studies is based on the recognition that individuals in in-depth interviews are those who "have special knowledge, status, or communication skills that they are willing to share with the researcher" (McMillan & Schumacher, 2001, p. 444). Moreover, the informants are chosen because they have access to information that is not available to outsiders (McMillan & Schumacher). An informant essentially provides a second hand observation data that researchers cannot see themselves.

In my study, sample size was small in order to address "information richness" in accordance with the purpose of the study. After receiving approval from the Behavioural Research Ethics Board (Appendix E), six participants were identified. Two participants were selected from a department in the College of Arts and Science; the other two were identified from a department

in the College of Pharmacy and Nutrition; and the last two participants were from a department in the College of Education at the University of Saskatchewan. These participants were professors with varying undergraduate teaching experiences and backgrounds. I incorporated both male and female professors in the study. Among the six participants, two were on their tenure-track and the other four were tenured professors. Two professors were administrators in their own departments.

Three ways were used to invite the participants for the University of Saskatchewan case study. The first way was purposeful case sample (Hatch, 2002, p. 98). Two professors with administrative experiences in their own departments were first selected because I assumed that they would provide their perceptions of the overall undergraduate teaching and learning in the particular department. The second method was random selection. I randomly selected the other two professors to participate in my study according to the faculty member lists posted on the University of Saskatchewan website. The reason for this method was that the brief introduction of background about each faculty member was usually presented on line in every college so that I based the selection on the available information. Third, I used snowball sampling to increase the number of participants (Hatch, 2002). The initial selection of professors referred to several potential participants after the interviews. Based on their reference, I contacted some professors and two of them consented to participate in my study. Thus I identified six participants. The above strategies of selecting participants can be classified as “mixed purposeful sampling” (p. 99).

The first contacts with all the participants were conducted by telephone and e-mail with an invitation letter (Appendix A) to invite them to participate in my study. Consent forms (Appendix B) were then issued to each participant explaining the intent of my study, research methods to be used, the way that the inquiry findings would be put into practice, and the ethical consideration involved. Then I and each participant mutually scheduled the individual interview after the participant signed the form and the consent was received. At the outset of each interview, I clarified the nature, purpose, and significance of my study to the participant. Meanwhile, I also assured every participant that the confidentiality would be achieved by pseudonym or anonymity.

Semi-Structured Interviews

The primary data source was semi-structured interviews (Stake, 1995). Semi-structured interviews, as illustrated by Hatch (2002), "are open to following the leads of informants and probing into areas that arise during interview interactions", and they are in-depth because "they are designed to go deeply into the understandings of the informants" (p. 94). Six professors with varying teaching experiences became the identified interviewees. Each interviewee had unique experience and stories to tell; moreover, by orally constructing their experiences, the interviewee provided a unique lens for me to interpret the nature and relation of teaching and learning phenomena.

Before conducting the six semi-structured interviews, I piloted my interview questions with one professor who was neither an identified participant nor related to any of the participants. This pilot test lasted approximately 90 minutes, and after it, I modified the interview questions. My interview process was composed of six semi-structured interviews and two follow-up interviews grounded in the data collected from the six semi-structured interviews. The reasons why I conducted follow-up interviews with two participants were twofold. First, before the initial interviews, two participants expressed their unwillingness to participate in the follow-up interview on account of their tight schedule. Second, another two participants found out later on that they were not able to afford the time for the follow-up interview although they had agreed to take part in it. Thus, my data were collected through six initial interviews and two follow-up interviews with two professors.

Based upon the fundamental research questions, I developed four streams of interview questions (Appendix C) with twenty specific questions for the participants in the six semi-structured interviews. These interview questions centered on the research focus of authentic learning, and the collaboration, critical thinking and problem solving skills of students. Each participant was involved in one semi-structured interview and only two of the six participants were invited for one follow-up interview according to the availability of participants.

Follow-up interviews were used to probe common themes emerging from data collected in the original interviews. Subsequently, follow-up interview questions were also constructed according to the previously collected data from the six semi-structured interviews in order to better interpret the teaching and learning phenomena. All the interview communications were accomplished through face-to-face personal contact. Participation in all the interviews remained

completely voluntary and each participant owned the privilege to withdraw from an interview anytime.

All interviews took place in the University of Saskatchewan so as to ensure a natural and relaxing environment for the participants. Each interview took a participant sixty to ninety minutes. And the two follow-up interviews lasted thirty minutes and ninety minutes respectively. Every interview was audio-recorded and transcribed immediately afterwards. Copies of the interview transcripts were distributed to every participant for "member checking" (Hatch, 2002). The participants had the opportunity to supplement, delete, or modify the transcripts before I analyzed the data. After the member checking, a *Transcript Release Form* (Appendix D) was sent to each participant requesting the signed approval of the use of their transcripts in my data analysis.

Data Analysis

According to research methodologists such as Hatch (2002) and Stake (1995), data analysis is the journey of seeking meanings. Hatch defined analysis as the process of organizing data "in ways that researchers to see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, or generate theories" (p. 148). In my study, the ultimate task of data analysis was to interprete professors' perceptions of their teaching practices related to authentic learning in undergraduate classrooms.

A Combination Model for Analysis

I combined Hatch's (2002) interpretive model and Hancock and Algozzine's (2006) stage model to analyze the data. Hatch claims that his model is "less prescriptive than exemplary" (p. 151). Hatch's model was a good fit for my study because the study had a constructivist nature, depending heavily on the naturalistic description and understanding of data. Second, the phrase of "interpretation" incorporated broad meanings. "Interpretation" is about making sense of social contexts in which social phenomena occur. Also, "interpretation" is about making inferences, and attaching researchers' own experiences to the data. "Interpretation" is about generating explanations as well (Hatch, 2002; Stake, 1995). Hatch explained that he based the definition of interpretation on the notion that an individual qualitative study has its unique ways to transform and understand data according to the purposes of study.

Hancock and Algozzine (2006) labeled their analysis model as a "stage model" (p. 59). The model that was used in my data analysis could be described as an adaptation of Hatch's (2002) model and Hancock and Algozzine's (2006) model. I incorporated the following steps:

- Identify research question as a whole
- Determine analytic categories
- Read through data and establish grounded categories
- Study categories for salient interpretations
- Reread data, coding places where interpretations are supported or challenged
- Review interpretations or a draft summary with participants
- Revise the previous interpretations or the draft summary, and then identify places that support interpretations (Hancock & Algozzine, 2006, p. 59; Hatch 2002, p. 181).

Prior to the data analysis, I transcribed and organized all the interview data according to every participant, and I issued it to every participant for their "member-checking" for modification. After participant transcript releases were granted, I began to analyze the interview transcripts with respect to the above stages.

First, at the early stage, the two research questions were the guides to interpreting the participants' perceptions about their undergraduate teaching philosophies and concrete practices. Next, I identified four analytic categories—authentic learning, critical thinking, problem solving, and collaboration because these four categories were the essential elements of the research questions and my interview questions were designed according to these four elements. Once the analytic categories were determined, I put them (authentic learning, critical thinking, problem solving, and collaboration) in the domains of teaching philosophies and practices respectively to achieve a thorough understanding of the data.

While reading through the data, I found the pervasive occurrence of several issues that became determinant factors throughout the participants' descriptions of authentic learning, critical thinking, problem solving, and collaboration. Thus, three major themes were constructed. I reviewed the data again and coded places where the three major themes emerged and looked for examples consistent or inconsistent with the themes. I marked these areas with different colors. In the process of coding, I found another case that stood out in the data and also broadened my understanding of the data. Grounded in my interpretations of the data, I decided to call it a special case in addition to the three major themes. According to the established themes, I then

drafted a summary to connect between the individual theme and examples related to it. In the latter stage, I compared my summary draft with the data, identifying and coding particular places that were divergent from each other or that deserved further interpretation. Finally, the factors that cast much influence on the themes were identified and the relevant examples to support my interpretation were coded.

Developing Trustworthiness

In the constructivist paradigm, data collection and findings generated are based on the criteria of credibility, confirmability, transferability, and dependability (Denzin & Lincoln, 1998; Guba & Lincoln, 1985). Credibility and confirmability were achieved in my study by means of member checking.

Hatch (2002,) described member checking as "the process of verification or extension of information developed by the researcher" (pp. 91- 92). Usually, it provides an opportunity for participants to react to tentative findings generated by the research and thus verify the trustworthiness, credibility, and confirmability of the data description. Member checking in my study was accomplished through the use of transcript release declarations, follow-up interviews, and the review of interpretations and descriptions of collected data.

Transferability can be understood in terms of usefulness, intensity, and completeness of the research design. From the perspective of naturalistic study, the multiple sources of data, the data collection methods, the varying perspectives to interpret the data, and the study findings fulfilled the transferability criterion because all of these mentioned aspects described the decision-making process in human lives. Qualitative researches have a significant impact on policy-makers in social contexts (Stake, 1995). In one sense, a qualitative study is transferable, because it provides potential implications for policy-makers to reflect the experiences in human life.

Ethical Considerations

All studies bring ethical decisions for researchers. Hatch (2002) asserted that "good qualitative interviews are characterized by respect, interest, attention, good manners, and encouragement on the part of researchers" (p. 107). In my study, ethical aspects were taken into consideration and accorded with the principles set by Tri-Council of Canada, University of Saskatchewan Advisory Committee on Ethics in Behavioral Sciences Research, and University Council. Prior to the interviews, a copy of the ethical approval certificate and a copy of the consent form

were given to each participant to read and to sign. After the interview, the transcript and transcript release consent form were sent to the participants to allow them to examine the transcript or and to make any changes if they felt necessary.

Anonymity was another ethical concern in my study. All participants in this study remained anonymous. In respect of confidentiality, pseudonyms or anonymity were used when referring to the names of participants. As the researcher, I reminded participants of the purpose and nature of the study and how the findings would be used and stored. Only I and my supervisor had access to the research data. All the data that were collected will be securely stored and retained for the five years in the Department of Educational Administration, University of Saskatchewan in accordance with the University of Saskatchewan guidelines. It is vital to ensure that participation in the study was voluntary, and participants always had the right to withdraw from the study at any time.

Summary of Methodology

In Chapter Three, I outlined the methodology of this study. The study focused on university professors' perceptions of their own teaching practices related to authentic learning in undergraduate classrooms at the University of Saskatchewan. I used qualitative case study research methods in the research. I utilized semi-structured interviews to obtain the data from six participants from three different disciplines. I presented the research questions and relevant interview questions to the participants with an opportunity to reflect on their teaching practices and to express what they were willing to share with the researcher. I audio-recorded and then transcribed the interview data. The participants owned the privilege to verify their responses and to make any necessary changes. I Present the data findings in the Chapter Four.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

In this chapter, I present the data collected from six initial and two follow-up semi-structured individual interviews with six participants from three different colleges in the University of Saskatchewan. The commonalities and differences that emerged from the interviews were categorized into three major categories: context, diversity of perspectives, and relationship. In *t*he first section of this chapter, I describe the demographic background information about the participants. In the next section, I present the themes emerging from the data collected. In addition, I dedicated one section to discuss one participant who was particularly insightful and another section to investigate the differences emerging from the data. In the last section, I summarize the themes related to the research questions.

Background Information about the Participants

I considered gender, academic discipline, and diverse academic experiences in the selection of participants to achieve maximum variation in the data (see Table 1). Each participant was given a pseudonym to protect his or her anonymity. The participants from three colleges—Arts and Science, Education, Pharmacy and Nutrition—were invited to describe their years of teaching experience at the University of Saskatchewan, the levels of undergraduate students they taught, the administrative work they undertook, the size of classes they instructed, and their career status (tenured or pre-tenured).

Table 1

Background of Participants

Names	Gender	Disciplines	Years of Teaching in University of Saskatchewan	Teaching Level	Administrative Role	Size of classes (small or big)
Jeremy	Male	Arts & Science	More than 10 years	3rd, 4th	Yes	Both
Dina	Female	Education	Less than 10 years	1st, 2nd	No	Small
Chris	Male	Pharmacy& Nutrition	More than 10 years	1st-3rd	Yes	Big
Amber	Female	Pharmacy& Nutrition	Less than 10 years	1st-4th	No	Both
Nick	Male	Arts & Science	More than 10 years	2nd -4th	No	Both
Mary	Female	Education	More than 15 years	3rd, 4th	No	Small

One participant had been teaching for over 15 years; three participants had been teaching for more than 10 years; and two had been teaching for less than 10 years. Five of the six participants had rich teaching experiences with more senior undergraduate students, and one of the participants was familiar with more junior students. There was a distinction identified by the participants between the size of classes: classes over 45 students were considered big classes and classes under 45 were small ones. Two participants taught small classes—less than 30 students generally according to their description. One participant taught only large classes—more than 90 students in a class. Three participants taught both small and big classes. Two participants were newly appointed administrators.

The diverse backgrounds of the participants influenced their perceptions about their teaching philosophies and practices. I present the data incorporating similarities and differences in the perceptions in the next section.

Data Presentation

The process of data collection and analysis was guided by the following research questions:

1. In what ways do university professors perceive their undergraduate teaching practices in terms of authentic learning, defined as critical thinking, problem solving, and collaboration?

2. How do professors describe their teaching practices contributing to transforming undergraduate students into critical thinkers, problem solvers and collaborators?

A. Herrington and J. Herrington (2006) stated that collaboration is "the collective engagement of participants in a coordinated effort to solve a problem or create a product which cannot be completed independently" (p. 6). This sense of collaboration has gone beyond simply "working together" and has evolved into a more profound stage at which every participant engaged in the process of collaboration is coordinated towards the same goal by undertaking a different role in the group. The authors continued, "in order to promote collaboration, collective work can be facilitated with an appropriate incentive structure for whole group achievement" (Herrington & Herrington, 2006, p. 6). Under the umbrella of A. Herrington and J. Herrington's definition, collaboration must be composed of two elements: an appropriate incentive structure and properly designed tasks. The incentive structure in collaboration should direct and assist in building up the collaborative cohorts in stages either formally or informally. Also, the tasks should be tailored especially to the collective group rather than to single students.

In such a collective group, every student is playing a unique and coordinated role in the process of task accomplishment. Emerging from my interviews with the participants, authentic collaborative activities embodied a two-fold connotation: teachers' scaffolding and coaching efforts and the tasks designed by teachers. Specifically, teachers were supposed to help forge the collaboration among students as well as the collaboration between teachers and students. Further, teachers were supposed to design their teaching tasks for the sake of the class as a whole rather than directed toward any individual student. Teachers' scaffolding and coaching also involved efforts to build up a collective cohort of students in stages.

In my process of data collection, I proposed a general question related to the participants' understanding of authentic learning. The purpose of this questions was to illicit their awareness of the notion of authentic learning. The participants were then asked to describe and reflect upon their teaching experiences and various aspects of undergraduate teaching and learning in relation to the research questions. In the next section, I categorized the data into Understanding of Authentic Learning; three other major themes (Context, Diversity of Perspectives, and Relationship); and a Special Theme (Dina's Belief Construction).

All the participants indicated that the different contexts, the diverse perspectives situated in those contexts, and the relationships that existed were the essential components of authentic learning abilities in terms of critical thinking, problem solving, and collaboration. The three elements were considered integral. Although I presented them as individual themes in the following section, they interacted with one another contributing to the development of students' learning abilities. Each theme embraces three domains of critical thinking, problem solving, and collaboration; however, I found that the philosophical understandings and specific practices concerning the three domains were not given equal attention by the participants. Generally, participants were more expressive with specific practices rather than philosophical understandings.

I present one participant, Dina, as a special case for the sake of her impressive descriptions. Dina was a prominent figure who expressively articulated her teaching philosophies and practices woven together by her system of "beliefs". Her perceptions enlightened me about the importance of how beliefs influence or transform people's practices.

Understanding of Authentic Learning

All the participants rated the following abilities as essential and inseparable factors contributing to authentic learning: the ability to reflect critically and to collaborate with others; the ability to understand context; the ability to solve problems according to a particular context; and the ability to expand capacity and enthusiasm for life-long learning. Specifically, most participants provided their personal understanding of authentic learning from different perspectives.

Jeremy, Amber, and Mary reckoned that students should make independent decisions for what and how they should learn in the learning process. Jeremy emphasized "students should demand the leadership of their own ways of knowing and leaning." More importantly, the three participants all felt this "leadership" comes from other learning activities entailing diverse think-

ing and hands-on experiences in different scenarios rather than conventional exams and note-taking in classrooms.

Mary also expected that students should learn to understand that learning is more "process-oriented" than "product-oriented". Namely, to master the learning process and relevant strategies was more important than to get high marks because "our understanding of the world is ever changing and refined in the learning process. Learning came from the construction of knowledge "by exploration, collaboration, communication with other people rather than the instruction of professors" (Mary).

According to Dina, learning is likely to grow as "one comes to face one's biases or prejudices, and to acknowledge one's deficiency in understanding." As a lifelong learner, one should mentally be geared up to experience and reflect on perspectives contrary to one's own in the process of learning. She felt it was the lifelong process of learning or knowledge construction that "leads to the content or outcomes of learning." "Diversity" and "real context" stayed central when Dina referred to her philosophy about "authentic learning". Dina highlighted those two elements because authentic learning in her perception was not only "what is going on in real life or what people are doing in real life", but also "a process in which students must be exposed to diverse cultures and thinking."

Because critical thinking, problem solving, and collaboration were essential components embedded in the authentic learning process, participants also expressed their perspectives on the relationship among the three components. Participants all agreed that critical thinking cannot be discussed apart from problem solving. Critical thinking is the ground for problem solving. According to the participants, the development of critical thinking and problem solving skills was an integral part of the learning process and students' participation in class dialogues and discussions definitely boosted that nurturing of critical thinking and problem solving skills. Students must learn to perceive the same phenomenon from a different perspective and look deeply at the situations to find out how and why some knowledge can be applied in that context. Some participants believed that critical thinking also contributes to forging a collaborative team because such a team was gradually built through active dialogues. On the other hand, critical thinking and problem solving skills would be achieved and optimized in an authentically collaborative group or community.

Dina stated that her teaching eventually arrived at the cultivation of "problem solving" skills, running through the process of "belief build-up" and "critical thinking development." Dina contended that students' problem solving ability came from their conscious awareness of their identity as a prospective educator. That awareness of identity mandated their acquisition of professional knowledge (knowledge of learning, curriculum, pedagogy, children and families or communities around them), the ability to read and live in the specific context(s), and the ability to make reasonable decisions accordingly. Furthermore, Dina held that it did not matter whether the outcome of problem solving was correct but that the process was important. She considered either "problem solving" or "critical thinking" as the process of risk taking, as what stated below:

> If everything is smooth, I'm not sure whether we're learning new things. But at moments when we really need to struggle harder to figure something out, I think those moments really present opportunities to learn something (Dina).

In the eyes of these participants, authentic learning is not only the incorporation of critical thinking, problem solving, and collaboration, but also a complex blend of these in context. Another crucial element in authentic learning is the ability to understand various and authentic contexts. Authentic learning is to immerse oneself in the world of diverse and different perspectives, then master the process of learning and decide on the learning content and strategies grounded in the understanding of the world. Also, authentic learning is a risk-taking process with a capacity for life-long learning.

Theme One: Context

Based on one perception that authentic learning involves the ability to understand real context, participants recognized that students' understanding of real context was a cornerstone for the development of critical thinking, problem solving, and collaboration skills. In particular, students could boost their learning skills only when exposed to a context with relevance to their pre-existing knowledge and experience. As one of the emergent themes from the data, the highlighted knowledge about real context came from a common acknowledgement of most participants. However, not all the participants perceived context as an evident theme when they were talking about philosophical understanding of collaboration. As a contrast, only Dina described her practices to enhance context design in terms of collaboration.

Most participants described students to be in their late twenties and to have had rich life experiences. Also, many employers nowadays demand the capability of university graduates to tackle practical and varied problems in real work places. Given this situation, students were likely to appreciate it if professors could blend their instruction with students' real life experiences. Nick believed "students' abilities to understand real context and to bring in their insights" contributed to "building up connections between theories and social realities." As a vibrant context incorporates scenario, knowledge, and perspectives, critical thinking is viewed as the ability prior to others to distinguish among diverse phenomena and knowledge.

Critical Thinking

Because most of participants considered *c*ontextualized knowledge as the premise for critical thinking, contextualized knowledge denoted that different contexts incorporated different perspectives as a result. It was described by the participants that the access to diverse or even conflicting perspectives paved the road to the development of students' critical thinking ability. It was also a common acknowledgement that students could best boost their critical thinking ability only when exposed to a particular context with relevance to their pre-existing knowledge and experience.

Amber and Mary suggested that in the learning and teaching processes, students need opportunities to examine and view the same phenomena in different ways when they are in different contexts. As Jeremy stated, only on the premise of fully understanding and discriminating among numerous perspectives in different contexts do students learn to reflect on a phenomenon independently and critically. Thus, critical thinking also played another role in learning in university classrooms. Jeremy observed in his discipline that "there are two extremes among students." The students "are academically oriented on their own," who endeavor to understand multiple social phenomena based on their acquired knowledge and experiences. By contrast, the students "are less academically oriented," who tend simply to accept opinions of other people without discrimination. Jeremy stated, "it is [the distinction in] the critical thinking ability that divides students into two poles."

Different contexts incorporate different perspectives. Thus, students' discrimination ability to sort through multiple perspectives rooted in varied contexts seems to play a crucial role in critical thinking.

Problem Solving

Problem solving denoted that students could not only learn or interpret the knowledge constructively, but also apply the knowledge to their real life in a constructive way. Students must be responsive and sensitive to different needs of people in their workplaces and in different contexts as well. The authenticity of problems was mentioned by all participants, although some participants rarely recognized that in their descriptions about teaching practices, some problems presented in class were merely "model" problems rather than real ones. Model problems as Jeremy explained are those that always have perfect or single answer(s).

All the participants stressed that the knowledge resulting from a context may differ. Due to the attribute that one context may differ from another. Consequently, real problems generated from a context are very likely to differ from each other. That is, it is impossible to apply a general theory consistently with all contextualized problems, which is a fundamental attribute of real problems as Jeremy and Mary described. This attribute was termed as "ill-structured" (Jeremy and Mary).

Dina believed that problems originating from real contexts are real problems. Under the umbrella of ill-structured problems in real contexts, problem solving as defined by the participants is the ability to devise appropriate strategies and paths, and work out problems accordingly. Jeremy further explicated that the process of learning would be "more rewarding and effective" if the process led students through real experiences with the ill-structured attributes. Ill-structured problems are not perfect problems with the preconceived solutions. Rather, these problems entailed a prerequisite that "only part of the knowledge required to solve problems were provided for students and students were motivated to seek a thorough understanding of the problems and address the deficiency in their knowledge" (Chris). In a sense, it is "students' responsibility in their learning to work out a solution or a plan to those problems" (Jeremy).

Problems from varied real contexts are likely to differ from each other and no general theory or strategy can fit all of them. Thus, problem solving is the ability to address individual problems according to their unique context.

Practices Contributing to Context Design

After the participants described their philosophical interpretation of context, I then investigated their perceptions about their teaching practices to enhance real context design. The partic-

ipants expressed in their teaching philosophies that the threshold for the growth of three abilities (critical thinking, problem solving, and collaboration) is to get students contextualized, I present the practices below with regard to context in terms of critical thinking, problem solving, and collaboration.

Critical thinking. Class discussions and presentations were routine practices in these participants' teaching. Apart from those practices, "field study", "case study", and "projects" along with video-watching and guest speakers were the common activities described to promote students' learning abilities in diverse contexts (Amber, Dina, Nick, and Mary). Compared to the other participants, Jeremy and Chris held opposite attitudes towards video watching, guest speakers, and field study. They believed that in-class discussions, presentations, and some case studies were the most appropriate activities that can enhance critical thinking in different context. Although various teaching activities, as Chris claimed, would help develop students' critical thinking, he said that he could not afford those diverse teaching methods currently due to his "financial or time constraints".

In Pharmacy and Nutrition, Amber observed that her students are getting younger all the time, ranging from 18 to 25. It was implied that most of her students had less life experiences compared to the undergraduates whom other participants were teaching. In her case, Amber decided to situate her students in a real context, hoping it would provide those students with life-like experiences. Field studies or case studies, as Amber believed, could generate authentic life lessons that students were immersed in and compared with that they have learned before. Communities in the neighborhood, superstores, hospitals, and cafeterias were the ideal sites where Amber supervised her students to conduct studies. For example, the students went to the Farmer's Market in order to get a real sense of what it was like to purchase and eat local food, and what the benefits are from local food. On the site, students spontaneously communicated with farmers and customers, observing, reflecting, and collecting relevant information and data. They were required to share their reflections and observations during the open post-study classroom discussion.

In Arts and Science, Jeremy geared his teaching toward the development of problem solving ability by assisting students with building up the linkage between social problems and theoretical frameworks. Jeremy described that his classes often dealt with the areas of race, gender, and social discrimination. He described some examples or phenomena occurring in daily

life at class to help students visualize the real social contexts. In this context, students were then motivated to think about social theories situated in a particular social scenario in a concrete and real way.

Jeremy said this method was feasible for those who were not local people, as well. Jeremy frequently provoked international students in the class to be retrospective about their experiences in their own countries to discover the relation between the theories and their own experiences. He insisted that universal issues be critically applicable locally; thus he generally grounded his teaching in students' experiences, showing how unique social demographic experiences can help elucidate theories presented in class. This method was believed to prohibit students' excessive reliance on the Internet because Internet provided massive but abstract information. "The localized knowledge and the application of that knowledge actually will push students to think about their existence, the politics of problems, the social demographic reality and problems in a broader sense" (Jeremy).

In Education, the case study to investigate the real situation was one of the common strategies that Mary implemented to promote not only critical thinking but also problem solving abilities. The adoption of video was a common method in the case study approach for Mary's students. By watching video, Mary required students to observe how and what those professional people were doing in the films, to reflect on, and to discuss their observations. Mary claimed, "This process really engaged students in an insightful and interesting experience."

Dina tried to create more space in the class for different opinions from which to see a phenomenon. In her teaching activities, Dina deliberated on how to engage the students in the process of phenomena analysis and reflection, promoting students to comprehend extensively rather than to jump to a plausible conclusion in haste. She said, "We need to move beyond those kinds of general comments to really look deeply at situations so that we can say what and why is it different from what I assumed? What and how I want to change? " With the acknowledgement that an effective ploy was to immerse students in real context by designing tasks that enabled students to experience scenarios of life authenticity, Dina required students to conduct field study, such as accessing the reading materials children and parents were using at that time.

Problem solving. Field research work or conducting surveys was the most popular method for nurturing problem solving skills, adopted by most participants. Chris and Jeremy were

exceptions because that they either could not afford the time for it, or they simply did not believe in it. A key point in these methods was to encourage students to explore the real world and build up connections between knowledge acquired from the literature or past experiences and real context.

As a natural science discipline, Pharmacy and Nutrition used considerable lab experiments. The adoption of lab experiments was considered a critical component of hands-on experiences. Chris said,

> I can't really give them (students) hands-on experience in every aspect, so they must get the experience in the lab on their own to know how to administer the sequence and effects of the cells, know how to predict the lifespan of the drug and what will happen to a drug when it's consumed, and know how to store it.

Some students may become pharmacists or similar health practitioners in the future; hence, knowledge about side-effects of drugs and drug quality control became mandatory according to Chris. This ability called for reliable counseling service to be provided for customers in the future. Chris described that he merely presented students the fundamental concepts and examples in biotechnology, such as the diverse effects of cells and drug processing on the human body. And then, Chris described that, against the background conceptual information previously provided, students conducted experiments in pairs and groups to observe the genuine process and effects under the supervision of research or teaching assistants in labs.

Similarly, Amber used scientific models in her class that have already been built in her profession so that the students could comprehend the model and predict or test some results. In class, with the supplemental aid of a film or a practical activity to help illustrate some concepts, Amber tried to ensure her students to observe how the concepts applied in real-life scenarios. If they dealt with a systematic concept, she demonstrated it and asked students to pay attention to the wholeness of the system. She made efforts to put students in the context of examples that illustrated how the macro-system could be applied in different situations, so that students observed variations and learned to define and solve particular problems. Amber also used case studies in addition to lab experiments to investigate the real situation as common strategies to promote critical thinking and problem solving abilities:

> I know some students may step in the line of food counseling one day. So I should ensure the students to be equipped with the information pertinent to the context. My students were required to work out an appropriate healthy menu for a family after their research in a local superstore and the financial situation of a family. Based on the understanding that students need to confront such problems, I deliberately set a very limited budget for a family's food consumption to increase the authenticity of the assignment.

In Arts and Science, Nick encouraged students to do field research work or an actual survey in order to learn the research methods presented in lectures. He anticipated that his students could apply the theories in social realties or social problems solution in his classes in relation to theoretical models. In Nick's descriptions, Nick presented students some real cases occurring in social realities to help his students build connections between social phenomena and theories. Further, his students were required to generate their unique perceptions about the implication of their daily life. As a consequence, Nick said, students deduced any classic or contemporary theories. Eventually, students understood the linkage between theories and realities. Nick stressed,

> What I really care is whether they (students) are capable of using any theory that fits a phenomenon and also developing their own theories, arguments, and questions. And they can guarantee the consistency in evidence, analysis, question, and theory.

On several occasions, Nick contrived tasks of data collection for his students in which students had to lay out ways to obtain information on TV commercials for six hours per day from two or three local TV stations at a certain period of time. "There were questions that should be kept in mind along with their data collection", Nick said,

> First, how many commercials indicated the message in terms of gender? Second, who actually was the central figure in the commercials to sell the products? Further, students had to analyze data by using a code book, identify variables such as the central figures, the gender, and the location, and find out how those commercials create or reinforce the gender preference.

When I asked about his expectation for data collection tasks, Nick explained, "Students were anticipated to interpret the hidden concept conveyed by those commercials, build up the connection between acquired theories and phenomena, and construct with an original vision."

In Education, Dina highlighted "real context" in her teaching. She believed it was new knowledge students should acquaint themselves with and acquire gradually. She created oppor-

tunities for her students to go in the real context of K-12 schools. She said, “Subsequently, students began from everything that had been in play already.” Through the progression of engaging students in critical reflection, she created opportunities for students to brainstorm approaches to problems, and to make independent decisions by inviting students to share what the problems were and what was happening. This process of brainstorming gradually integrated conversations about readings and the ways they would live out theories in real life. Often, Dina led her students into real school contexts to do research or try some new methods. They would return to reflect upon the problems emerging from their research and seek ways to solve them. In this way, students were equipped to theorize from phenomena occurring in real life schools.

Mary neither gave students a definition of a phenomenon nor a ready-made answer to a problem. Rather, she asked them to refer to their experiences and to work out a definition or a solution by steps, because she believed students would engrave the procedures and experiences on their mind if they had to solve the problem on their own. In class, slide presentation was Mary’s favorite method to immerse students in the sense of real context. Often, slides presented different people, different behaviors, and different situations in different countries. The more she tried to expose students to the real world, the more it triggered them to think, “Why is the professor asking us to watch this? What relation does she want us to build up?” (Mary). As a consequence, students were motivated to find the link between the real world and the theory, and to define the problem and eventually solve it.

Collaboration. As revealed in the data, many participants were inclined to perceive collaboration in terms of relationship. Little attention was paid to collaboration when most of the participants were asked to describe their perceptions about collaboration in terms of context. There was one participant from Education (Dina) who explicitly elaborated how she optimized the development of collaboration in relation to context.

Dina thought it crucial to utilize the classroom context to enlighten her students on the awareness of their unique identity as a professional teacher and as an individual as well. She described that this awakened awareness was achieved mainly through the buildup of a close community. She modeled the whole process of community building in front of her students, providing a real scenario of application for students to observe. Dina described how she was committed to facilitating the building of study groups:

> I intended to be very informal with my students and treat them as my colleagues… I often provided [description of her strategy] because that's what professionals did when they had a staff meeting. In this way, my students felt comfortable to approach me and talk about their concerns, reflections… It was through this close relationship that I've learned most about their learning styles, and then, I can direct them in an individual way as much as I can.

Being exposed to the process of modeling, students were enlightened on how to forge a collaborative community in a class context. Dina also believed that students eventually formed their own cohort with an aroused awareness of collaboration in a particular context.

Summary of Theme One

Context was a key theme emerging from the data. Participants either explicitly or implicitly suggested that students' understanding of real context was the bedrock for the development of critical thinking, problem solving, and collaboration skills. Although participants did not touch upon the role of context in collaboration skill when talking about teaching philosophies, they acknowledged the significance of context in collaboration when talking about teaching practices. Thus participants described how they were devoted to design activities to enhance students' knowledge about real context. Generally, real context rendered diverse perspectives and real problems, which immersed students in an authentic world and helped them screen voluminous information, to make decisions among them, and to learn the importance of collaboration in such a learning process. I discuss the theme of diverse perspectives next.

Theme Two: Diversity of Perspectives

Diverse perspectives with relevance to varying real contexts were emphasized by all participants when referring to the development of students' abilities concerning critical thinking, problem solving, and collaboration. Most of participants believed that across all disciplines students have to fully access and understand some knowledge that is both the information about a particular scenario and the embodiment of multiple perspectives generated in that particular context. On the ground of understanding such knowledge, students' abilities are gradually constructed. They learned to independently reflect on a phenomenon, to make decisions, and to take actions to solve a problem.

Most participants did not mention diverse perspectives when referring to problem solving, either philosophically or practically. Only a few participants identified that sufficient conversations should be encouraged before problem solving because co-learners need to share and expand their visions from different perspectives. The underlining reason for the difference in the participants' perceptions may be that these participants considered problem solving and critical thinking abilities as the integral component in learning in terms of the diverse perspectives.

Critical Thinking

In Education, both Dina and Mary acknowledged that most of their students were mature adults who had plenty of life and work experiences. However, Dina stated, her students were primarily white and middle-class residents of Saskatchewan except for a few minority students. Then, how to generate critical thinking among the students of similar backgrounds stood out as one of the nucleuses in Dina's teaching. Dina believed that a critical thinker should learn to reflect on the belief of "who you are, what you do, and why it will be different". What follows is her interpretation of the infusion of critical thinking in students' learning process:

> Critical thinking mostly implies that my students can perceive the same phenomenon from a different angle in a particular context rather than make general comments; so they need to look deeply at the situations to find out why some (theories) can be applied in that context and where their understanding comes.

In view of the life background of her students, Mary further stated it is comparatively painful for people with plenty of life experiences to hearken to, and ponder opinions contradictory to their pre-assumed ones. Hence, in Mary's understanding, to be critical thinkers will not only demand "the exhibition of respect for other perspectives or backgrounds but also the acknowledgement and understanding of the perspectives contradictory to one's own."

As for Jeremy and Nick in Arts and Science, critical thinking connoted the ability to challenge "the formulated assumptions" about some phenomenon and develop one's own innovative and insightful perspectives (Jeremy), while "the challenge must be grounded in the evidence or any theoretical framework" (Nick and Jeremy). Jeremy also termed this process of critical thinking articulation as "experiential learning". Nevertheless, critical thinking is not necessarily equivalent to "criticizing." Rather, critical thinking should sparkle with wisdom, innovation, and

insightfulness. “Critical thinking must include criticism, and more important, the unique and reflective perspectives. It’s not only important in my discipline but also in all disciplines and work places” (Nick).

In Pharmacy and Nutrition, Amber described the notion of critical thinking as “the ability that students are able to form thought patterns and articulate by themselves.” She said it would be crucial that students could develop their own understanding and design their paths to achieve the understanding although the basic concepts are in texts.

Collaboration

All participants referred to “dialogues” as fundamental and effective means to nurture diverse ideas, especially open dialogues going on in a group or a community. Jeremy emphasized that teaching turned out more fruitful in an environment of ample dialogues. Some participants further stated that mutual dialogues “in formulated thoughts” would stimulate the blossoming of critical thinking (Jeremy and Chris). On the other hand, Jeremy pointed out it was comparatively awkward to develop diverse perspectives within a large class size. He stated, it was primarily impracticable to facilitate plenty of dialogues in a large class that exceeded sixty students.

“Dialogues” were specifically highlighted throughout Dina and Mary’s descriptions. Dina elaborated on how “dialogues help build up a sense of community” because the dialogues promoted mutual understanding of students and reinforced trust and cooperation with one another. Mary said she endeavored to expose her students to the context of multiple and open dialogues throughout the whole learning process. Mary also claimed that as an integrated part of authentic learning, collaboration incorporated the sense of forming a cohort or a “community of practice”, which is one of the crucial and fundamental skills that students should possess in their current academic life and in their future work life. In such a community, teachers as resource persons and facilitators should ensure their students collaborate with one another in collective learning activities in which students learn how to rely on one another, to solve problems collaboratively, and to become open to new pathways to diverse perspectives and thinking.

In particular, Mary clarified the role of different perspectives playing in collaborative tasks. She claimed, “You wouldn’t want a brain surgeon to be in partnership with five and only one of them operates and nobody else gets the chance ever.” In Mary’s philosophy, any collective task without the element of diverse perspectives is just “group work”. She contended group

work was the simplistic and unrefined stage compared to collaborative work. Mary stated that most group work ignored the participation of each member in a group, which more likely ended up with solely one or two members' efforts in a form of "group". She further claimed, "I don't accept group work because I think everyone has to develop individual skills especially in teaching reading and writing (subjects)."

Practices to Enhance Diverse Perspectives

Critical thinking. All participants identified engagement in diverse contexts and mutual dialogues as the prerequisite for the development of critical thinking. Thereby, various approaches were applied by the participants to create opportunities for "mutual dialogue" in a particular context, such as video, field study, guest speakers, classroom questions and discussions, semi-notes, and comparative learning methods. Data also showed that classroom questions and discussions were the most popular approaches that most participants reported to operate.

Dina believed that "social justice" was a prominent issue in education. She also knew she had to decide whether to treat it as a fashionable word or to take it as an opportunity to boost critical thinking in her teaching. The following example could be of some assistance to illustrate how she intended to nurture critical thinking ability in her teaching.

In a project, realizing that students should consciously understand how social justice has been living out in a classroom, Dina reminded her students to contemplate "how to ensure the children in your own class see themselves in the stories whenever you are presenting a story to them." As she explained, "the readings for children is perhaps about cultures, about families with single parents, about the same sex parents in the story, about how immigrant family immigrated to a new country." Therefore, it was of significance for children not only to "see themselves mirrored and valued in stories, but also to learn the life of other people is different from theirs." As a student—a prospective teacher in the discipline, he or she was committed to reflecting on the question: If children are from different family backgrounds, how does the literature reflect the real situation and what should be done to ensure the application of "social justice" into classroom teaching? The project ended up with an artistic design of task, entailing the collective story build-up, revision, and completion; and the process of story-making was underpinned by the previously established thinking revolution.

In Pharmacy and Nutrition, some of Amber's classes demanded the understanding about the benefits and non-benefits from local and imported food. Amber assumed it would benefit students to invite guest speakers such as pharmacists, doctors, faculty, and individuals in a community with expertise to deliver specialized lectures. Those guest speakers held contradictory opinions about the same phenomenon. Thus those contradictory ideas could create a context where students could objectively acquire knowledge from different perspectives and construct their personal interpretations. Apart from guest speakers, Amber sought to gauge understanding from her students about this aspect through mutual questions and discussions. According to her description, she preferred abundant class questions and discussions to a formal and traditional class lecture format. As she thought, questions and discussions that engaged nearly all students in class proved to be fruitful in bringing in a variety of ideas. Thus, she often asked students to reflect on what the majority literature talked about and what the minority view was.

To prevent students from accepting the enormous information and opinions without discriminating among them, Chris adopted "semi-notes" in class, which provided key concepts with blanks alongside, where students had to fill in their ideas and reflections arising in class and afterwards. Chris regularly reviewed students' thoughts on their semi-notes to verify if critical thinking and learning were framed in the process.

In the faculty of Arts and Science, questions and discussions, as Jeremy described, encouraged students to voice their opinions, so that students would get alternate ideas "that are contradictory to their own and they tend to remember those ideas" (Jeremy). Grounded in the observation that the first and second year students usually were passive toward learning and lacked sufficient background knowledge of a course, Nick used the approach of questions and discussion to motivate their thinking. In view of his mind-set that "critical thinking occurs when a student can make an argument", Nick often blended his teaching with debate or discussion groups on certain issues, which he thought was instrumental in examining the different perspectives students may have.

He claimed that there were several distinct demographic cohorts in students' composition: international students, aboriginal students, and minority students. There were also other cohorts of students: disabled students and homosexual students. Often, each sub-group was prone to novel opinions contrary to one another on a particular issue. The impact of different, even conflicting opinions produced a dynamic world of thinking for students. Nick recalled:

> Years ago when I taught a class of family issues, I had an aboriginal student in my class who really was annoyed at the textbook. He argued, the book talked a lot about family and relevant ideas, however, the book didn't include any aboriginal perspectives about family issues—gender and family relations. Then he developed his own angle of argument at classroom discussion. So I asked this student to present (his argument) to the whole class from an aboriginal student's perspective to look at the family issues. The most important was why and how his ideas differed from what presented in the textbook. Till now I still believe it was a very exciting and valuable experience in my teaching.

In addition, there were some personal approaches that Jeremy and Nick preferred in teaching, which were termed as "comparative learning" approaches (Jeremy and Nick). Both participants found "comparative learning" functioned well in the process of critical thinking cultivation. They argued that comparative learning created capacity for students to compare various theories from diverse perspectives across different lifespan. In the learning process, students were committed to discovering why the same theory was interpreted from different perspectives, what distinction was disclosed among the different perspectives, and the impact of the distinction on social phenomena. Likewise it was fruitful when students could become familiar with the historical contexts for the existence of theories, as Nick and Jeremy depicted. Jeremy described:

> In some classes, I presented very non-traditional theories, asking students to think through them (in terms of) how they might be related historically, why these theories came into being in a certain context. (And) I showed students how some theories were working and were realized in real life to help students comprehend that some theories were not applied so expansively (as they once were); the world is not quite the same as it was supposed to be. So, students were bound to think of the world critically when they would live it out in the real world in the future.

In general, Jeremy believed that he made every effort to "establish a dynamic world where the ideas are always in conflict, and always questioned by different students." In addition to the research task in historical contexts for the students, Nick required students to assess and to present the applicability of those theories. He believed that students' assessment was based on a systematic analysis of modern social phenomena in order to challenge their acquired or existent thinking patterns.

Collaboration. As interpreted from the participants' descriptions, professors should make commitments to forging students' learning groups because mutual dialogue takes place in student' learning groups or communities, and it generates diverse perspectives. Yet, seemingly half of the participants had not achieved it successfully because of time and class constraints. As a result, it was a common phenomenon that the obligation to create a learning group was always that of students spontaneously or intentionally. However, there were a few exceptions among the participants who were willing to develop students' diverse perspectives in a collaborative team.

In Arts and Science, Nick said that he encouraged students to develop informal study groups. He said, "Students normally gathered on a regular base to discuss the puzzles or any issue relevant to the course and paper writing, and share the notes [taken] at class." Nick created discussion groups consisting of five or six students. Each discussion group was assigned a particular issue and had a representative to summarize the points in the discussion. In some of his courses, Nick would designate study groups among students that would run through a whole academic year. Each study group was assigned a group project incorporating project design, group discussion, questionnaire design, data collection, and the involvement of each group member.

In Education, Mary described that in group projects, which demanded a high level of collaboration, every student was required to be engaged in "conversations about how to determine their project interest, research methods to collect, analyze, and present data, and how to blend their personal experiences in the project." She said that every project she assigned to her students basically demanded two elements: the embodiment of diverse ideas from individual students in a community, and the presentation of their collective work to the whole class.

Dina was convinced that various activities would enhance and deepen dialogue among students; therefore, she facilitated activities such as group discussions, group projects, and social activities to achieve "deep dialogues". Dina described, "I and my students had lots of dialogues over their assignments, over the comments I made on their works, and over the criteria for the assignments." Such "collegial and professional conversations", created more capacity for students to reflect from diverse views, to understand others' perspectives, to learn from each other, to transform their pre-existent views, and to put the new ideas in practice creatively (Dina). She strived to get students to realize that the learning experiences they would have is richer by talk-

ing and working collectively rather than by being isolated. More importantly, students seemed to become passionate to participate in the dialogues or discussions in pairs or in groups.

Summary of Theme Two

As diverse perspectives are the outcomes produced by various contexts, participants expected their students to comprehend different perspectives and the specific context or environment. The participants believed that students could progressively formulate unique thought patterns, develop their own insights, and figure out solutions to a particular problem in real context. Participants also identified "dialogues" in classrooms as the most common and effective method to ignite vigorous discussions. Dialogues bridged collaboration and diverse perspectives because the process of sharing ideas, regardless if they were contradictory to each other, promoted multi-level understandings among students and reinforced trust and co-operation among teams.

Therefore, in the descriptions of teaching practices, many participants were aware it was fundamental to build up a collaborative team by exposing students to the context of ample conversations. Discussion groups, study groups, and group projects were normally adopted to reinforce interaction and dialogues in a collaborative team. Likewise, video, field study, guest speakers, classroom questions and discussions, semi-notes, and comparative learning were implemented by participants to expose students to diverse perspectives and to cultivate independently critical thinking of students.

Theme Three: Relationship as a Pedagogical Method

The perceptions of participants on relationships converged with the acknowledgement that relationship primarily included two levels: relationship between the students as a collectivity and the instructor, and relationship among students. All participants stated that collaboration usually came from a close relationship. Subsequently, close relationship emerged through dialogues. When it comes to participants' philosophical understanding of relationship embedded in critical thinking and problem solving, although the participants acknowledged the significance of relationship in the two domains, they described little about the role of relationship in critical thinking and problem solving. Dina was the only participant who described relationship as a visible theme in problem solving when referring to teaching practices.

In general, all participants in data were inclined to look upon relationship as a predominating theme in collaboration. That difference in perceptions did not mean that participants failed

to see the importance of relationship in critical thinking and problem solving. Rather, many participants regarded relationship as a fundamental pedagogical method to enhance critical thinking, problem solving, and collaboration. Consequently, collaboration was considered an integrated method that incorporated critical thinking and problem solving.

Collaboration

There were three different strands among participants' perceptions about the collaboration for the reason that collaboration as the outcome of relationship, consequently emerged at the same two levels as relationship did. They were: (a) collaboration between the students as a collectivity and the instructor; and (b) collaboration among students. Thereby, participants held different or sometimes conflicting opinions on the significance of collaboration in their teaching philosophies.

Jeremy felt that the former outweighed the latter in his classes because collaboration between the students and the instructor would enable the instructor to best facilitate the learning of students. However, he admitted that learning outcomes would be more successful if students were able to form their own cohorts either formally or informally.

Chris and Mary held perspectives contrary to that of Jeremy. They discovered in the learning process that collaboration among students was a common phenomenon, and that the level of collaboration contributed to their optimal learning outcomes. Chris further explained, "when I assign a task for them (students), they should rely on one another, collaborating to figure out how to solve it. I'm a resource person and mainly collaborate with my students through teacher or lab assistants." As to the question of why collaboration among students was more common and rewarding, Mary elaborated:

> Because they (students) are co-learners and they must develop their own 'communities of practice'. So they must learn to be a member of their community even when they go out of the university. They must learn how to share, how to solve problems collaboratively and then know how to learn together. This collective way helps them be open to new pathways to different perspectives and thinking.

The other participants seemed to consider collaboration in a more balanced manner. The collaboration among students, and the collaboration between students and their instructors often interacted in the learning and teaching process. In the process of facilitating collaboration at both

levels, Amber, Dina, and Nick suggested that they played multiple roles of coach, mentor, friend, and resource person.

Dina stressed that "both levels of relationships occur frequently in my teaching and they are equally important." Refraining from interfering in the learning activities when students were in collaboration to work on their assignments, these participants provided resources for students such as information, facilities, and other kinds of assistance. For example, Amber said, "as a professor, I should find a way to work out, to ensure that every student participates in the collective tasks, to be a member of a study group. I should also show them I'm available so that they can come to me, talk to me anytime." On the other hand, some participants paid equal attention to the collaboration among students. Dina stated:

> As a teacher, I always consider showing who has the talent and celebrate it with students in an authentic way and then the relationship among students is built up without always coming to me.

Nevertheless, all participants acknowledged that the collaboration building went through a thorny journey. Students were more willing to do an individual assignment rather than to participate in a collective one, because the former was more convenient for them to control the time and pace to accomplish it. However, Mary insisted that mutual and collective communication should be "valuable" as "communication would boost the learning outcomes of the students." Therefore she advocated that professors take the responsibility to optimize the collaboration among students even if more time and opportunities for communication would be invested.

In Dina's philosophy, sufficient communication and interaction were of great importance in the process of forging a close relationship from which collaboration originated. To achieve it, her classroom was warm, informal, and relational, always grouped in a circle and structured by dialogues. This process of relationship building was evident through most of Dina's teaching practices.

Practices to Enhance Relationship

In this section, participants did not talk about practices particularly related to critical thinking but focused much on practices related to collaboration. The issue of how relationship was achieved to enhance critical thinking overlaps with the issue of how diverse perspectives were achieved to enhance collaboration. As to the practices concerning problem solving, all par-

ticipants except Dina did not see a connection between this skill and relation development, although they mentioned the importance of collaboration in problem solving when stating their philosophies.

Most participants reported that classes that incorporated some elements of the Internet were of help in terms of the development of relationship in the learning process. Amber, Dina, and Mary once instructed on-line distance courses and found that the teaching experiences they obtained largely enhanced the relationship build-up. Dina recalled that she set up discussion groups on PAWS (the university campus interactive system), requiring students to communicate with one another more freely and flexibly.

Mary described her class as a paperless one where not only all students submitted their papers and posted questions through PAWS, but also she posted reading materials and assignments for students through PAWS. Mary could review students' assignments electronically and send it back with a criteria sheet. Also, she posted pictures, slides, audio clips, and CDs. Through PAWS, Mary and her students deliberately built up a learning platform on which the instructor and her students were able to share resources, experiences, and problems.

Jeremy was different from other participants, claiming that too much reliance on technology would jeopardize the relation between the instructor and students. He was confident that human interactions determine dynamics of a good class. Nonetheless, Jeremy acknowledged that the proper adoption of technology definitely improves his teaching.

Problem solving. Grounded in her notion that the most rewarding path to problem solving comes through close relationship, Dina perceived her role as a facilitator and resource person in the learning process. Group meetings were also common between Dina and those students in need. Undoubtedly, many students turned to Dina when they experienced difficulty and confusion. In those cases, Dina usually attempted to find out "what is going on in students' life, what puzzles them (students), and how to better support them rather than solves the problem straightly for them" (Dina).

Dina appeared devoted to the building-up of the relationship among students to forge a community. Describing herself as a "colleague" of the students who were considered novice professionals by Dina, Dina enjoyed sharing teaching leadership with students. Dina said,

> We (she and her students) carefully select the reading materials, having numerous discussions about what the readings meant. I do some demonstrations about how the theories in

> the readings are applied in real life so that students could integrate the theories into their own experiences. I also model in the class in front of them (students), showing them what and why a professional teaching is doing and thinking. Sometimes, they organized their own discussion groups and I was invited to join their discussion. I think, in this way, students will build a very close relationship and they will get used to working out (problems) in a community threaded by that close relationship.

Dina claimed that collaboration was also achieved in the problem solving process by providing students with opportunities to co-design and co-polish an assignment. The notion of "community" was articulated in every aspect of her teaching. In detail, "leadership", "care", and "respect" guided Dina's teaching practices.

Collaboration. It was commonly acknowledged by the participants that close relationship in a classroom cohort would optimize the level of collaboration among students. Dina depicted that before every collective assignment, she first allocated some classes for the students to meet their group members on a regular basis to get familiar with each other. Thus a community was gradually developed. Another acknowledgement among the participants was that their knowledge about the needs of an individual student was essential to planning for the group tasks. By having meetings with individual students, the participants acquainted themselves with concerns, reflections, and backgrounds of students' lives and studies; and they worked out effective ways to involve those students in collective tasks. Chris stated,

> I firstly look through the students' backgrounds: some students have very strong chemistry background while some not. So I need to balance what I teach in my class. I spend time with those students of weak chemistry background, providing them some basic courses of bio-technology in order to involve them in team task in the future.

Most participants claimed that working in pairs or groups definitely promoted students' collaboration and it was a popular approach in a moderately sized class. Amber, Chris, Dina, Mary, and Nick all referred to methods they normally adopted to facilitate students' pair or group work. Sometimes students organized their own favorite pairs or groups, and sometimes the instructors designated students in pairs or groups. Nick reported that he would designate study groups among students that would "run through a whole academic year" in some of his courses. Each study group was assigned a group project incorporating "project design, group discussion, questionnaire design, data collection, and the involvement of each group member" (Nick).

The teachers sometimes modified the assignments according to the varied learning abilities of students, and they deliberately paired less motivated students with more able students in group tasks or paired them with teaching assistants in tutorials. The latter was commonly adopted by Chris and Amber in Pharmacy and Nutrition. The participants said this method proved to enhance relationship not only among individual students but also among the whole class. They also stated that group tasks always had a clear and specific goal to achieve, because collaboration usually calls for a common goal and collective efforts. Hence, group tasks turned out effective in building up collaboration. As Mary explained, “In a real sense of the close community, the interaction and participation is intensified. Not everything has to filter through the teacher.”

When examining the descriptions of the participants, I was surprised because seemingly Mary and Dina were the only ones highly conscious of and expressive about their pacing and staging when they coached and scaffolded the students to build up study groups and to complete a collective task. Dina described how she integrated both individual and collective components in most assignments, gradually augmenting the level of collaboration among students and creating more capacity of students for using peer mentorship. Proper pace and gradual progress were carefully dealt with when Dina assisted her students to create their own study groups. She stated that although most of the assignments had both collective and individual components, the extent of collective tasks was boosted in reasonable proportion:

> Normally, my first assignment was a completely individual task; the second one was a less individual one; and the proportion of individual decreased while the proportion of collective component increased, and in the end, the assignment was completely collective. In the last assignment, students were required to thread such elements together—the course readings, class discussions and personal life experiences, and their own beliefs on who they were and how they were developing in this profession. Eventually I asked students to present their final work that should demonstrate how they worked as a group rather than an isolated individual.

Dina also emphasized what she was attempting to impart to her students in this process was “how everyone should facilitate learning for his or her colleagues in a community.” Perceiving the collaboration among students as her “successful moments”, she commented, “it’s suc-

cessful when I didn't negotiate with them, when I didn't suggest it, I didn't step in. But I can see them being caring people with one another." When asked how her belief of "relationship" has been applied effectively in her classroom teaching to solidify students community, Dina referred to those moments at which students were spontaneously bonded together. She described with great passion:

> There were moments when some students were experiencing the special occasions in their life no matter what good or bad happened. And the rest of class never forgot to express their care, kindness, and sympathy to those students.

Mary described how she was coaching and scaffolding the students to build up a study group and complete a collective task. She integrated both individual and collective components in most assignments, gradually augmenting the level of collaboration among students and creating more capacity of students for their peer mentorship. Mary deployed a modeling—collective or individual—strategy in her class. She either organized students groups and pairs to complete some collective tasks after she modeled a process of a learning activity; or she divided a collective project into steps for individual students in designated and diverse roles.

Moreover, Mary was the only participant who put forth the notion of the differentiation between "working together" and "working through different but coordinated efforts." Mary stated that most group work ignored the participation of each member in a group, which more likely ended up with one or two members' efforts in a form of "group". The descriptions of most participants would imply their ignorance of the essence of collaboration in many cases though they adopted collaborative methods to promote students' learning outcomes. For her, collaboration meant that students "get together and feed off each other's ideas in a synergistic way in order to be open to new pathways to thinking, sharing and solving problems in their own cohorts; so the sense of teachers' learning develops and bounces" (Mary).

Mary stated that she specified different tasks to be completed in a collective assignment for students, which she believed could engage students in "coordinated efforts". She explained that, whether working in groups or pairs, each student in a collective task must take a unique role, and that the outcome of the assignment must be the embodiment of collective efforts rather than the segments of individual work. Mary found it most effective when she conducted a "structural arrangement" for learning activities. Structural arrangement implied that in all the collaborative tasks, no member in a group or a pair "ever got all resources for a task so that they (students) had

to be involved in collaboration" (Mary). To accomplish a task, students must share available resource and seek solutions. Mary said that she even would not provide a perfect problem for students. Therefore, students "must get together, share, put every piece of the puzzle together, and eventually work out the situation they are in" (Mary).This process of collaboration and coordination was not mandated by Mary. Rather, she acknowledged, it occurred spontaneously in a more informal manner among students.

On the other hand, some participants pointed out that collaboration varied with grade levels and the size of classes (Jeremy, Chris, Amber, Nick). In the large classes and in the lower grade one or two classes, the majority of course assignments were individual tasks; while in small classes and in higher grades or in higher-level programs (e.g., the Honor's program) the whole situation was reversed. In all of the assignments at the Honors' level, there was a high percentage of collective work for students. "It's really collectivity pursued" (Jeremy).

These participants acknowledged that to some extent, it was difficult to put students in the collective assignments especially in large classes. In some large classes, there was little collective work for students (Chris and Amber). Nor was it easy for the professors to motivate students to do the collective work. In their daily teaching, it was common for the participants to encourage students or to assign students in pairs or in groups (formally or informally) to complete a task, a presentation, or a project, and also to help forge collaboration among students via labs and tutorials. Nick stated "the level of collaboration largely depends on the content and the size of a class, and, depends on the preference of the instructor—to what degree the instructor is willing to provide opportunity for students' collaboration."

Summary of Theme Three

As the data suggested, relationship as a dominating theme stood out particularly in collaboration. Most participants identified the existence of relationship in the other two domains of critical thinking and problem solving, yet they emphasized collaboration. It is possible that participants took relationship as the unique attribute specially possessed by collaboration. In light of the two levels of relationship identified by participants, collaboration subsequently bore the same level of implication: (a) collaboration between the students as a collectivity and the teacher, and (b) collaboration among students.

The philosophical understandings of participants seemed to follow three strands. One strand held collaboration between the students as a collectivity and the teacher outweighed the other level of collaboration. Another strand held the reverse idea; and the last strand held an impartial and balanced attitude toward the two levels of collaboration. Whichever strand the participants took, they all acknowledged that it was difficult to build collaboration. However, they believed that sufficient communication and interaction were critical in the process of forging a close relationship.

As a result, practices such as the addition of the Internet, and pair or group tasks were intended to forge relationship in a collaborative community. Participants said that the acquaintance with students' concerns and backgrounds was prerequisite for the development of relationship in a community. Moreover, Mary and Dina identified their pacing and staging in coaching and scaffolding students to create study groups and to conduct collective tasks. Mary further explained her notion of the differentiation between "working together" and "working through different but coordinated efforts." Other participants mentioned that collaboration varied greatly with grades and size of classes.

Special Theme: Dina's Belief Construction

The philosophy of "belief construction" was claimed by Dina to be the underpinning of the authentic learning process. Although other participants blended their beliefs in their descriptions with regard to their philosophies, Dina was the sole participant who kept "belief" in mind, and who illustrated it in a theoretical and ideological way throughout the interviews.

Understanding of Dina's Belief System

I felt it was important to discuss Dina's philosophy of "beliefs" with regard to authentic learning. Her notion of beliefs deeply touched me. She advocated that authentic learning was a learning process through which students constructed "their unique beliefs", understood why and where their beliefs originated, and knew how to translate those beliefs into real-life actions. She placed much stress on beliefs because she believed that people's thinking was steered by core beliefs and that action was structured by beliefs. She used "artifacts, relationships, being fair and equal, and learning from experiences" so that her classroom was structured in a way to represent those beliefs. She stated her reason for adopting that practice as "it's my pedagogic belief: if I

want my students to be the ideal professionals, I need to teach them the way I am." She sought to implant in her students what to know and why to believe some issues in their professions, and how to implement their beliefs in a real context.

As for her teaching in the specific discipline, Dina held that a qualified teacher must build his or her convictions regarding the issues of children, family, community, and what education really was about. Delivering a course that involves belief comparison, reflection, transformation, and establishment, Dina endeavored to facilitate her education students to develop their convictions. She viewed this conviction building process as an essential "journey of educators". Moreover, according to Dina, people's beliefs are challenged by the development of critical thinking and problem solving abilities; however, it is the very process of interaction which leads to the maturation of these abilities and beliefs. To Dina, "critical thinking" and "problem solving" were crucial factors to develop beliefs of "teachers' judgment/decision-making", "the sense of teacher's identity", "sense of being a reflective practitioner", and "the ability of knowledge articulation." Grounded in the above understandings, the awareness of critical thinking, problem solving, and collaboration stand out in the learning process for Dina.

Practices to Enhance Belief Construction

The course of belief development, articulation, and translation was core to the cultivation process of critical thinking and problem solving abilities. To Dina, what always stayed central to her teaching was the ability of students to develop, question, and articulate "what and why I believe". A rationale for their beliefs was constructed by students as a result of Dina's teaching. According to her, the process of realizing, shaping, and articulating beliefs was more valuable than defining a belief.

Dina's first class assignment was what she called "Knowing Self." "I ask them to bring their artifacts to the classroom and then I ask them to tell orally or write a personal narrative about the artifact and we talk about how we may frame our beliefs." She said, "I want them to think: does your belief arrive from something important? Does it lead to that belief that's generalizing your life and that you can act on as a person in any aspect of your life and as a professional?" "Knowing Self" and the reference to metaphors such as "Mirror and window" and "Train to somewhere" were employed from the first class even throughout the students' internship program. It sought to enlighten students' awareness of critical reflection on knowledge they received.

Students would submit their papers at the end of the course, revisiting their beliefs, and translating them in real life. Dina was confident that to some extent, being exposed to the process of exploration, students would gradually shape their unique belief system and start to reflect critically on their beliefs when taking their actions or decisions.

Summary of Special Theme

I feel that Dina's "belief construction" was too conspicuous to be neglected. She explained that people's thinking is steered by core beliefs and that action is structured by beliefs. Delivering a course that involves belief comparison, reflection, transformation, and establishment, she said that she endeavored to facilitate her students to develop their convictions. Simply put, students would construct "their unique beliefs", would understand why and where their beliefs originated, and would know how to translate those beliefs into real-life actions.

Differences Emerging from Data

Some variations in the themes emerged and I attributed these nuances to the different backgrounds of each participant. The differences discussed in the following section relate to themes of context, diversity of perspectives, and varying relationships emerging from the domains of critical thinking, problem solving, and collaboration.

There were more similarities than differences in the participants' philosophical perceptions; however, variations did exist in certain areas. It was difficult to discern the influence of gender, years of teaching, and career status on the data. But, it was evident that the features of class size, discipline, teaching level, and administrative position all interacted with each other; the interaction of those features lead to the varieties in the participants' perceptions regarding teaching philosophies and practices. The varieties existed in the promotion of understanding in contextualized knowledge diverse perspectives, and relationship with regard to critical thinking, problem solving, and collaboration. Nevertheless, class size, discipline, teaching level, and administrative role were not the only factors that influenced participants' perceptions. There was another factor—teaching belief possibly played a role as well.

Class Size

As the participants stated, there was a distinction due to the size of classes they taught. Dina and Mary taught small classes—fewer than 30 students in a class. Chris taught only large

classes—more than 90 students in a class. Amber, Jeremy and Nick taught small classes and large classes. The influence of class size became more manifest in the teaching activities.

Class size impacted participants' perceptions of teaching practices more than philosophies did. Generally, the participants who taught only small classes tended to nurture a more interactive relationship in their classes, which led to a more intensive collaboration. For example, Dina and Mary taught only small classes.

Dina admitted that she could not manage a class with over 45 students in the way she had currently been teaching. Mary described in her classes, "the interaction and participation is intensified in a real sense of the close community." "Dialogues" were also abundant in Dina's classes. The scope of dialogues ranged from the assignments, the comments Dina made on her students' work, and the criteria for the assignments. Dina enjoyed sharing teaching leadership with students. She provided students with opportunities to co-design and co-polish an assignment. Out of the sense of a close community, students were motivated to become passionate about the participation in the collective tasks.

In large classes such as Chris taught, it was difficult to attempt large-scale collaboration. Chris also emphasized that as an administrator, the effective teaching in the large class of more than 90 students was the traditional lecture model supplemented with tutorials, labs, and some discussion groups to achieve the collaboration in his classes. In other words, Chris believed that it was impractical for him to invest much time on promoting collaboration between him and his students. Instead, the collaboration mainly arose among students, or between students and lab assistants.

Compared to Chris, there were three participants who taught both large and small classes. Nick, Jeremy, and Amber claimed that their teaching activities varied according to different courses and size of classes. Their teaching activities were blended traditional lecture format, which mainly focused on the explanations and presentations of theoretical frameworks to students, with interactive or dialogical formats that aimed to engage students in collective activities such as discussions and projects.

Discipline

Disciplinary differences also influenced participants' perceptions of their teaching philosophies and teaching practices concerning context and relationship. Specifically, differences

occurred in the domains of critical thinking and problem solving related to context, and of collaboration related to relationship.

Context. In his philosophical understanding of context, Jeremy described his observation of the existence of two extremes in his students when they were exposed to a real context: students who were self-driven to understand multiple social phenomena, and students who accepted perspectives of other people without reflection. Those extremes, as Jeremy stated, were the result of a distinction in critical thinking ability. He emphasized the importance of critical thinking in different contexts because he believed that students are confronted or exposed to diverse authentic social contexts and phenomena in this discipline. Without critical thinking ability, students are bound to get lost in the vast amount of information.

As a participant from Pharmacy and Nutrition, Amber thought the students her department recruited were getting younger; thus, she created opportunities for students to access real contexts and professionals from different workplaces. She said that those opportunities would equip students with a sense of what real world is in this profession. Her perception diverged from that of other participants. Although many participants adopted similar practices to boost students' comprehension of critical thinking in real contexts, they claimed that those methods targeted to build connections between students' life experiences and real context because many of the students were over 30 with rich life experiences.

Difference across disciplines also exerted its influence on the activities concerning the nurturance of problem solving ability. It was noticeable that Pharmacy and Nutrition as a natural science discipline required lab experiments that are considered a critical component of hands-on experiences. Amber and Chris viewed labs as an indispensable activity to achieve the enhancement of problem solving ability. Students had to conduct experiments in pairs and groups under the supervision of research or teaching assistants in labs to observe the process and effects. Chris said, "I can't really give them (students) hands-on experience in every aspect, so they must get the experience in the lab on their own to know how to administer the sequence and effects of the cells, know how to predict the lifespan of the drug and what will happen to a drug when it's consumed, and know how to store it."

Relationship. As all participants perceived collaboration to emerge from two levels, as a result, three strands of attitudes concerning collaboration arose from the data. Jeremy favored the collaboration between him and his students. Chris and Mary held that collaboration among stu-

dents was a common phenomenon, and that the level of collaboration contributed to their optimal learning outcomes. The other participants considered that collaboration among students and the collaboration between students and their instructors often blended with each other in the learning and teaching process.

As a consequence, their perceptions varied regarding the practices to enhance relationship in a collaborative team. The notable difference in the practices was that Mary and Dina were conscious of their pace and stages when coaching and scaffolding their students to build a study group and complete a collective task. Coincidently both of them were from the Faculty of Education and they both expressed similar notions when referring to the practices to build a collaborative team among students. According to the descriptions, these two participants integrated both individual and collective components in most assignments, gradually augmenting the level of collaboration among students and creating more capacity of students for peer mentorship.

Proper pace and gradual progress were addressed when Dina assisted her students to build their own study groups. Mary advocated the ability to differentiate between simply "working together" and "working through different but coordinated efforts." Some participants stated that they specified different tasks to be completed in a collective assignment for students working in groups or pairs. Each student in a group was to take a unique role in the collective task, and the outcome of the assignment was to be the embodiment of collective efforts rather than segments of individual work. Specifically, Mary found it effective when she conducted "structural arrangement" for learning activities. Structural arrangement implied that in all the activities of the collaborative element, no member in a group or a pair ever got all resources for a task so that students had to be involved in collaboration. Lab was a conventional disciplinary component of Pharmacy and Nutrition education. It was a common practice that Amber and Chris often grouped students with teaching assistants in tutorials.

Administrative Role

Administrative role was visibly connected to participants' perceptions of teaching practices to enhance critical thinking in a real context. Two participants, who were in administrative positions, brought out conceptions that were different from the others.

To address the goal of exposing students to diverse perspectives from different contexts, Amber, Nick, Dina, and Mary used video, field study, and guest speakers to create opportunities

to get students exposed to different viewpoints in different contexts. They described that by watching videos, students were enabled to observe how and what professional people were doing on site, and to discuss about their observations, reflections, and conclusions. Guest speakers from different professions, who were invited to deliver specialized lectures of contradictory opinions about the same phenomenon, could create a context where students can objectively acquire knowledge from different sides and construct their personal interpretations.

On the other hand, Jeremy and Chris admitted they seldom adopted such approaches in their teaching activities. The causes for this difference in the specific teaching approach, as Jeremy and Chris stated, were time limits and personal pedagogical beliefs. Chris stated, "I'm in urgent need of time for I'm doing three jobs at the same time: research, teaching, and administration." As an administrator, it implied that the insufficient time put a constraint on the inclusion of supplementary efforts in the teaching activities. Both participants believed it was the on-class intelligent discourse, such as lectures delivered by instructors, which developed students' abilities to the greatest extent.

In other words, Jeremy regarded it as a more worthy expert performance: the professor's effective methods or strategies to articulate the knowledge and the intellectual discourse during the traditional in-class lectures. He believed that those methods or strategies could motivate students to express themselves in various ways, including discussions by students that were generated from the lectures. Thus, the teaching activities they utilized to promote critical thinking, as Jeremy identified, were still "very traditional but not in a pure lecture format", because the inclusion of field work, video, and guest lecturers in the class was insufficient to "change students qualitatively" (Jeremy).

Teaching Level

Teaching level was connected to participants' perceptions of their teaching practices concerning relationship. In addition, teaching different levels interacting with class size and other potential factors, led to the differences in collaboration.

Some participants acknowledged that efforts to forge collaboration among students varied with the grades (Jeremy, Chris, Amber, Nick). In the large classes and in the lower grades (e.g., grade one or two), the majority of course assignments were individual tasks; while in small classes and in higher grades or in higher-level programs (e.g., the Honor's program), the whole

situation was reversed. In these assignments at the Honors' level, there was a high percentage of collective work for students. "It's really collectivity pursued" (Jeremy). Although collaboration varied with grades and the size of classes, there emerged a coincidence: those professors were female teachers who adopted a more collegial and dialogic approach in their teaching. Amber who taught both large and small classes stated, "it's still doable to make a large class more close to each other and bring more dialogues in it." It seemed clear that lower grades challenged the fostering of collaboration because of their higher enrolment.

A Recessive Factor: Teaching Belief

It was difficult to classify some differences presented in the data under any of the above categories. There was no evident proof in the participants' descriptions that specific factors influenced the perceptions of participants. Yet, according to clues emerging from the data, another factor of teaching belief seemed to provide a credible explanation for the differences. These differences were perceptions of practices to enhance collaboration in real contexts, and to improve problem solving ability through the process of relationship building.

Dina was the only participant who elaborated on her perception of context as one of themes emerging in collaboration. Her perception was evidently traced back to her belief system that had impact on Dina's teaching philosophies and practices. Dina believed in the benefit of collaboration, the awareness of identity as a professional and individual, and the importance of expert modeling in the real classroom context. She modeled for her students in the classroom, demonstrating how a collaborative community was developed.

Also, Dina was the only participant who held that the development of problem solving ability would be optimized through close relationship in a community. Because of Dina's belief system of "community" and "shared leadership", she had regular group meetings with students; she invited students to share opinions on their learning materials and her teaching methods; and she provided them with opportunities to co-design an assignment or a task.

Likewise, beliefs influenced differences in Jeremy's perceptions of practices about problem solving. As did other participants, Jeremy acknowledged the proper adoption of technology benefited his teaching, but he was not as passionate about technology as were other participants. He insisted that excessive reliance on technology, particularly the Internet, would damage the relation between the instructor and student. He believed that the dynamics of a collaborative

classroom were composed mainly of human interaction and communication. Jeremy also admitted that the technological method he used was PowerPoint. In contrast, other participants talked about various experiences related to their other on-line course teaching, the Internet, PowerPoint, and the use of videos and CDs. Some participants further established an on-line platform for better communication among students, and interaction between professors and students.

Most differences occurred under themes of context and relationship, and the influx of features such as discipline, teaching level, class size, and administrative position all contributed to the variations. Apart from the existent features, I assumed that participants' personal beliefs were another potential factor that led to their different perceptions.

Summary of Data Presentation and Analysis

In this chapter, I presented participants' perceptions in the themes of context, diverse perspectives, and relationship. The three themes emerging from the research questions were related to participants' perceptions of their philosophical understandings and specific practices concerning critical thinking, problem solving, and collaboration. Dina's belief construction was presented as a special case. The following interpretations from the perceptions of participants summarized the data.

The findings showed that professors considered the following attributes as fundamental in the authentic learning process: students' abilities of critical thinking, problem solving, understanding of the contextual nature of knowledge; their skills in interacting with professors and their classmates; and the capacity for life-long learning. The finding presented was consistent with my research hypothesis that also focused on critical thinking, problem solving, and collaboration. Findings also indicated that critical thinking and problem solving abilities were an integrated; and that the former was the ground for the latter. Furthermore, participants acknowledged that the education of critical thinking and problem solving should be rooted in real contexts of diverse perspectives.

The notion of understanding contexts was highlighted by all the participants and appeared in every aspect involving teaching philosophy and practices. Although participants did not touch upon the role of context in collaboration skill when talking about teaching philosophies, they acknowledged the significance of context in collaboration when talking about teaching practices. Thus participants described how they were devoted to design activities to enhance students'

knowledge about real context. Generally, real contexts exhibited the chaos and complexity of real life; and real problems arose in such life authenticity. Thus, when immersed in real context, they were driven to learn to observe phenomena critically and independently, and to learn to solve real problems when they entered in the real world in the future.

One context may differ significantly from one another, diverse perspectives rooted in various contexts were different as well. Participants expected their students to comprehend not only different perspectives but also the specific context or environment where a certain perspective was produced. They also expected that students would progressively formulate unique thought patterns, develop their own insights, and figure out solutions to particular problems in real context. Participants also advocated that "dialogues" not only ignited vigorous perspectives but also bridged collaboration and diverse perspectives. Therefore, in the descriptions of teaching practices, many participants were aware that it was fundamental to build up collaborative teams by exposing students to the context of ample conversations.

Relationship as a dominating theme stood out particularly in collaboration. Participants took relationship as the unique attribute inheriting collaboration even though most participants identified the existence of relationship in the other two domains of critical thinking and problem solving, In light of the two levels of relationship identified by participants, collaboration subsequently bore the same level of implication: collaboration between the students as a collectivity and the teacher, and collaboration among students. The philosophical understandings of participants emerged as three strands: (a) one strand held collaboration between the students as a collectivity and the teacher outweighed the other level of collaboration; (b) another strand held the reverse idea; and (c) the last strand held an impartial and balanced view toward the two levels of collaboration. Participants identified that the acquaintance with students' concerns and backgrounds was prerequisite for the growth of relationship in a community, and that all teaching practices to enhance relationship followed. Moreover, Mary and Dina detailed their pacing and staging in coaching and scaffolding students to build study groups and conduct collective tasks. Mary further explained her notion of the differentiation between "working together" and "working through different but coordinated efforts."

Field study, case study, projects, video-watching, and guest speakers, classroom questions and discussions, semi-notes, and comparative learning were all implemented by participants as various methods to cultivate students' critical thinking and problem solving abilities.

Discussion groups, study groups, and group projects were normally adopted to reinforce interaction and dialogues in collaborative teams. In the college of Pharmacy and Nutrition, lab experiments were indispensable course requirements that ensured hands-on scientific experiences for students.

Dina's "belief construction" was prominent in the data. She explained that people's thinking is steered by core beliefs and that action is structured by beliefs. Delivering a course that involves belief comparison, reflection, transformation, and establishment, she endeavored to facilitate her students to develop convictions. Students learned to construct "their unique beliefs", to understand why and where their beliefs would originate, and to translate those beliefs into real-life actions.

Variations emerged in the data. It was evident that the backgrounds of participants such as discipline, class size, teaching level, and administrative position exerted influence on the perceptions about philosophies and activities in relation to critical thinking, problem solving, and collaboration. Most of the differences occurred under themes of context and relationship. Apart from the existent features, I assumed that personal belief was another potential factor that led to some different perceptions. But, potential factors remained unexplored in this study. In this chapter, the data presented provided a ground for the discussion of consistency, discrepancy, and deficiency in the data, and in implications for the future. Those topics I addressed in the next chapter.

CHAPTER FIVE: DISCUSSIONS, IMPLICATIONS, AND REFLECTIONS

My study focused on professors' teaching philosophies and specific practices with regard to the development of critical thinking, problem solving, and collaboration skills. Six professors from different departments with diverse teaching experiences and career status participated in semi-structured interviews. They described their perceptions about their undergraduate teaching with reference to critical thinking, problem solving, and collaboration. Three common themes emerged from their descriptions: context, diversity of perspectives, and relationship as a pedagogical method. In addition, "belief construction" arose as a special case of Dina. In this chapter, I discuss the data in relation to the relevant literature; I suggest implications for future teaching and research with regard to critical thinking, problem solving, and collaboration in the authentic learning process; and I reflect on what I learned from the experiences.

Discussion

In the past twenty years, the focus of theories of teaching and learning have gradually shifted from objective knowledge transmission to meaning-making processes. When referring to education, contemporary theorists stress human efforts in exploring the world, human understandings generated about their inner selves and the external world, and knowledge about the process of exploration. Such perspectives have influenced teaching and learning in higher education both philosophically and in teaching practices. Contemporary theorists have used the term "authentic" when describing a teaching and learning process. Critical thinking, problem solving, and collaboration are also considered as features of authentic learning. Therefore, I present the discussions on authentic learning, critical thinking, problem solving, and collaboration in the light of consistency and discrepancy between the existing literature and the data from my study.

Authentic Learning

Diverse learning theories have developed during the past two decades. Under the social constructivist paradigm that is where my concept of authentic learning lies, researchers such as Boyer (1990), Biggs (1991), D. W. Johnson and F. P. Johnson (1997), Mezirow (1997), Wenger (1998), Dryden and Vos (1999), J. Herrington and Oliver (2000), Jacob and Hellstron (2000), Schuetze and Slowey (2000), Raven and Stephen (2001), Senge, Scharmer, Jaworski, and Flowers (2005), and McGonigal (2007), conceptualized learning as a process through which people negotiate, communicate, and shape their relation with the world, and ultimately develop or create

experiences and understanding about the world. These learning theories described the nature of knowledge and the learning process, and the interplay between contexts and learners as intellectual human beings.

Learning is a social learning process, which is not only life-long, but also life-wide (Schuetze & Slowey, 2000). It is also a progressive process of understanding contexts through one's participation and negotiation with the external and the internal worlds (D. W. Johnson & F. P. Johnson, 1997). In the eyes of constructivists, learning is not a matter of processing objective information, but rather it is a series of activities occurring in a context. The process of teaching is one of the most complex human activities because the learning process goes far beyond the notion of simple information transmitting from one person to another.

The above perceptions about authentic learning also found their resonance in the teaching philosophies and practices of professors I interviewed from the University of Saskatchewan. Mary stated "our understanding of the world is ever changing and refined in the learning process. Authentic learning comes from the constant construction of our current knowledge by exploration, collaboration, and communication with other people." These participants held that authentic learning comes from the constant construction of current knowledge as people go through the process of exploring, communicating, and understanding the world around them. Learning must be situated in real contexts, connected with the life experiences of students.

It was interesting to me that some participants termed the learning of their students as "experiential learning." Mary said that learning should be "process-oriented" rather than "product-oriented." In the constructivists' eyes, "experiential learning" stressed learning processes that learners have to experience. "Experiential learning" adherents believed that learning is not only a progressive process of knowledge but also a progressive process of learning abilities development from real life practices (D. W. Johnson & F. P. Johnson, 1997). However, I wondered whether "experiential learning" was merely a fashionable term, because when I reviewed the participants' perceptions about teaching practices around the development of critical thinking, problem solving, and collaboration abilities, I identified some inconsistency in the participants' perceptions about their teaching philosophies and practices.

Before the interviews, I had assumed that different professors may possess different understandings of "authentic learning"; however, the participants' perceptions of authentic learning showed a consensus. Problem solving, critical thinking, and collaboration abilities were ranked

as essentials of authentic learning process and authentic learning was also viewed as a life- long learning process. These three components of the authentic learning process were also highlighted by Mezirow (1991), D. W. Johnson and F. P. Johnson (1997), Wenger (1998), Raven and Stephen (2001), and McGonigal (2007) in their learning theories. Furthermore, these participants advocated that students cannot be the passive recipients of knowledge transmission. They must become the architects, producers, and designers of their own learning process. This idea echoed D. W. Johnson and F. P. Johnson (1997), who stated in their experiential learning that learning, as a series of experiences and procedures, is a responsibility which never rests with teachers but with the learners themselves.

J. Herrington and Oliver (2000) created a dynamic authentic learning framework. Their framework implied that teachers scaffolded opportunities to enhance collaboration among students, and immerse students in real context with diverse perspectives and ill-structured phenomena. Finally, students gradually develop their own thinking and problem solving models. The same idea was reflected in the data. All the participants expressed that knowledge about some real contexts, the access to diverse perspectives, and collaboration among students were the important in nurturing students' critical thinking, problem solving, and collaboration abilities.

Yet, some discrepancy exists between the literature and the data from my study. In the constructivists' perspective, "context" is the most fundamental attribute of learning as Jonassen (1991) stated that "learners can only interpret information in the context of their own experiences" (p. 11). When I examined the perceptions of my participants, I found that seldom participants were conscious of the significance of context in collaboration development with reference to their teaching philosophies. However, later on I discovered that most of the participants utilized context to enhance collaboration when they described their teaching practices. Dina clearly presented how she took advantage of classroom context to implant the notion of "community" and "collaboration" in her students through her teaching activities. Apart from her, most of the participants designed group projects and case studies, which all exposed their students to real scenarios. Thus, I realized that although participants could not summarize their philosophical perceptions about the relation between context and collaboration, most of them had virtually implemented "context" in their practices before they could describe it. Teaching practices and philosophies are not always parallel with each other. Sometimes practices take a lead and vice versa.

Wenger (1998) advocated that a formal learning structure cannot be designed. J. Herrington and Oliver (2000) specified that teachers can only design an environment to enable learning rather than to instruct students' learning process. This assertion implied that students should master their individual learning process, and that teachers should mentor or support students in their learning process. These ideas suggested that teaching must go beyond the current unit instruction. In my data, less than half of the participants moved beyond the rigid sequence of the single unit in their teaching practices, but they focused on the promotion of students' meaning-making in real contexts. In some aspects, learning theories preceded current teaching practices, as they often did in history.

Summary of Authentic Learning

There are more consistencies than discrepancies between the literature and data findings concerning authentic learning. Both the literature and data findings suggested that learning o the social process through a series of activities. Authentic learning is a life-long learning process, in which learners negotiate and communicate with the inner and external worlds, and thus shape their new relation with and understandings of the world. The literature and data findings echoed with each other that three components are vital to the authentic learning process: critical thinking, problem solving, and collaboration.

Nevertheless, ideas diverged when it came to the concept of context. In the constructivist perspective, context is fundamental in authentic learning process. The cultivation of critical thinking, problem solving, and collaboration is supposed to be situated in a particular real contexts. Philosophically, no participant recognized the significance of context in collaboration development. In contrast, many of them described how they utilized context to forge collaboration in their teaching practices. It is evident that most participants had implemented context in their teaching activities before they could articulate the importance of context in collaboration development. Some learning theorists advocate that learning structure should not be designed and teaching should go beyond the rigid and isolated unit instruction. The data findings suggested that less than half of the participants moved beyond the single unit format and taught for the sake of students' needs and interests. Teaching practices and ideology do not always keep pace with each other. Practices sometimes are ahead and vice versa.

Critical Thinking

Mezirow (1991) stated that adult learners must go through a critical reflection process of perceiving, questioning, examining, and revising their past experiences, eventually transforming their world views and forming new ones. From the contemporary constructivists' perspectives, teachers should make commitments to designing real world contexts and helping students develop their unique, personal thinking patterns by exposing students to diverse perspectives rooted in such real world contexts (Jonassen, 1991). Without any doubt, context is considered one of the premises for authentic learning in constructive learning theories. The professors from the University of Saskatchewan possessed the same belief that contextualised knowledge is important for enhancing students' critical thinking ability, provided that students are exposed to a context with close relevance to their pre-existing knowledge and experience.

McGonigal (2007) also stated that perspective transformation is a fundamental process of authentic learning. He also specified the responsibilities for teachers to scaffold their students' perspective transformation. In general, teachers should design different contexts for students as they learn. Thus, students are likely to examine their thinking and discover the limitations in their perspectives, to identify the underlying assumptions within their current knowledge domain, and eventually to test new perspectives through the application of new knowledge and approaches. This interpretation of critical thinking process supports the idea of Mezirow (1991), Jonassen (1997), and McGonigal (2007). In my study, most participants adopted various means such as group discussions or debates, videos, guest lectures, field studies, case studies, to presente various real contexts and perspectives for their students.

Although asking questions was the most common method to engage students in active thinking, West (2007) warned that it is over simplistic to claim that the major task of fostering critical thinking is to engage students in asking questions or in dialogues. West's warning implied that some types of questions may not function effectively in promoting students' critical thinking without using a deliberate process of question design. Some participants may have failed to achieve their initial goal of promoting students' critical thinking because there was little question design that I discovered in their descriptions of their teaching practices.

In contrast, descriptions of Dina and Mary about their teaching activities suggested they structured students' discussion with explicit steps or strategies of predicting (brainstorming), questioning, summarizing, and clarifying, to engage students in constructing the meaning of reading materials. In the process of scaffolding students to construct meaning, these participants

also ceded their control of using the strategies to the students by asking them to take turns leading the discussion.

Philosophically, all participants acknowledged that the access to different perspectives in varying contexts was beneficial for the promotion of students' critical thinking ability. Participants implied that critical thinking had a two-fold significance: independence and collaboration. Independent critical thinking, as Nick and Mary explained, was not only the ability to respect and understand ideas contradictory to one's own, but also the ability to question one's pre-existent thoughts and to construct one's innovative thinking patterns. It was a common recognition among the participants that students' critical thinking ability would be reinforced if they were grouped to work with their classmates. Mezirow (1991) interpreted the relation between critical thinking and collaboration as "a collaborative learner who is critically self-reflective and encourages others to consider alternative perspectives" (p. 206). Therefore, the participants put students in pair or group discussions, so that students would get alternate ideas contradictory to their own. They emphasized that students' points of views were valued even if they were conflicting with mainstream thoughts. Also, dialogues with conflicting opinions established a dynamic world for students that enabled them to understand a phenomenon from multiple perspectives. Dina contended that the ability to articulate beliefs should be the core of critical thinking. Hence, "knowing yourself" ran through Dina's classes, so that eventually her students established their unique thinking and were able to consciously transfer their beliefs in real life practices.

The literature did not identify a specific teaching process design for the cultivation of critical thinking; at best, the literature provided a rationale for concrete teaching practices. In this respect, Dina's and Mary's strategies would add to the current literature. The two participants explored and designed a process with explicit steps to achieve the enhancement of critical thinking ability. Such awareness of steps was missing in other participants' descriptions about their teaching practices.

Summary of Critical Thinking

Both the literature and data findings viewed context and diverse perspectives as fundamental attributes of critical thinking. Both further suggested that professors should scaffold such learning environments for students, such that they are exposed to a context with close relevance

to their pre-existing knowledge and experience. In their daily teaching practices, most participants adopted various means such as group discussions or debates, videos, guest lectures, field studies, case studies, to present various real contexts and perspectives for their students. Although questions were the common strategy used to trigger critical thinking, the literature implies only deliberately designed questions work effectively in enhancing students' critical thinking. Some participants in my study may have failed to achieve their initial goal of promoting students' critical thinking, because there was little evidence of carefully designed questions. In contrast, Dina and Mary were discovered to structure their students' discussions on reading materials with explicit steps or strategies that helped improve students' meaning of reading materials.

Collaboration was another connotation of critical thinking. The literature and data findings recognized that critical thinking would be reinforced in a collaborative team or community. Genuine dialogues would be encouraged in a collaborative community and each member would voice his or her perspectives. All the participants put students in pairs or group discussions, so as to cultivate critical thinking. The existing literature I reviewed failed to devise or present a specific teaching process designed for the cultivation of critical thinking. Thus, the strategies and steps designed by Dina and Mary to enhance critical thinking would contribute to the current literature.

Collaboration

When it comes to collaboration, there emerged both consistency and discrepancy between participants' perceptions of their teaching and perspectives of the literature. Although all participants stated it as part of teaching philosophy that collaboration originated from a close group relationship in which all co-learners would share, rely on one another, solve problems in coordinated efforts, and become open to new thinking and perspectives, some participants did not adopt collaboration as a pedagogical teaching method. Some of them seemed to take collaboration as a special strategy to be utilized in certain tasks. Jeremy acknowledged that collaboration normally occurred in group projects in some of his classes.

On the contrary, constructivist advocates contended that collaboration should go beyond a special and single strategy to address some particular task. Rather, it should be a holistic method to design curricula, classes, and teaching activities. Sackney and Mitchell (2000), and Owens and Valesky (2007) identified the following essential characteristics of an authentic learning group: collective goals, sharing decision making empowerment, genuine dialogue, arti-

culation of ideas and knowledge, flexible roles that students and teachers assume in teaching and learning activities, reflection, and collaborative and learning-oriented approaches toward problem solving. A. Herrington and J. Herrington (2006), and Owens and Valesky (2007) proposed that teachers should expose students to the context of collaborative articulation of knowledge by means of forums, conferences, the Internet, and regular classes. Also, more able students can mentor and coach their peers.

It was a positive finding that Dina's class was almost entirely a collaborative community. She attached importance to the promotion of the sense of community in the process of building collaborative groups among students. With the artistic design of classes, Dina illustrated the importance of collaboration to her students, and she encouraged her students to understand, care about, and share concerns and other life experiences with their classmates.

Most participants acknowledged that dialogues would help forge collaboration and vice versa. Many participants said that they supported students in setting up regular conferences and agendas for group discussions over such issues as how to accomplish a particular task, different roles that every group member would play, and resources the group might need. The participants claimed that they sometimes were engaged in those conferences, as well, in order to effectively scaffold the environment, based on the understanding of students' needs and concerns. To better facilitate those genuine dialogues, Dina further utilized discussion groups on PAWs and the Internet, as a supplementary channel to accommodate the need for extensive communication.

In addition, Owens and Valesky (2007) contended that collaboration may occur at multilevels. All participants acknowledged the existence of bi-levels collaboration in their classes: collaboration between the collective students and the instructor, and collaboration among the students themselves. Although participants outweighed one level over the other, they all felt that collaboration would definitely optimize students' learning outcomes, if students could form their own cohorts. Sackney and Mitchell (2000), and Ramsden (2003) cautioned that collaboration may occupy considerable effort and time of the teachers before it comes to shape. The participants also foresaw the hardships in building up collaboration among students, and Dina and Mary stated it was time and energy consuming to help students forge an efficient student collaborative community.

Wenger (1998) focused on engaging individual learner's participation into the practices of social communities, and on constructing participants' identities in relation to these communi-

ties. J. Herrington and Oliver (2000) claimed authentic learning occurs in collaborative environments. Social constructivist perspectives place the stress on the interdependence of social and individual processes in the action of knowledge co-construction. The idea is that by drawing upon a larger collective memory and the multiple ways in which knowledge could be structured among individuals working together, groups could attain more success than individuals working alone (Wenger, 1998; Sackney & Mitchell, 2000). A. Herrington and J. Herrington (2006) advocated that more able students should play multiple roles to mentor and coach their classmates. Amber, Dina, and Mary believed the investigations of the connectedness and complexity of real-world problems nurtured collaboration among learners. These participants reported they witnessed through collaboration with their classmates, that students refined and enlarged their knowledge, and accumulated new understandings to apply them to their solutions to the new problems. As they moved toward solutions, students identified conflicting perspectives; and when it was time for resolution, students presented, justified, and debated their solutions, looking for the best plan.

According to the findings of my study, the participants all appreciated and encouraged students to be the decision makers and leaders in their own learning. However, only half of the participants consciously realized that the initiatives of students could not spontaneously occur, and that teachers must design and facilitate the process in proper pace to transform students into the true masters and inventors of their learning. Dina and Mary deliberately allocated the proportion of individual and collective components in students' assignments. Following the proper rhythm, students were gradually adapted to the collective task. They undertook their multiples roles of co-learners and mentors, and eventually worked in collaboration with one another.

D. W. Johnson and F. P. Johnson's (1997) models may be considered a lens with which examine the participants' perceptions about their teaching practices concerning collaboration. The "discussion group model" highlighted instruction theory, the role of group coordinators (who may be teachers or leaders), and the objective curriculum materials. The disadvantage of that model is its failure to develop a worthwhile goal of learning new knowledge and skills as it adopts a fit-for-all approach. As suggested by the data, more than half of the participants still adopted a similar "fit-for-all" approach in their efforts to enhance collaboration. For most participants, the notion of collaboration simply stayed at the level of group work. Some participants

understood collaboration as merely "working together, conducting the same task at the same time."

Collaboration indeed is more than working together. D. W. Johnson and F. P. Johnson (1997) proposed a "growth and counseling group model" that focused on the higher level of the hierarchy of needs of group members. The themes of the group were to promote psychological welfare, healthy human relations, potential for diverse culture, sense of belonging, atmosphere of mutual respect and trust, interpersonal skills, new insights, and honest feedback. It not only required a high extent of commitment of all members to the success of the group, but it placed the same high demand on the shoulder of group leaders to create conditions for the transformation through becoming a resource expert. Mezirow (1991) was another advocate that students should be involved in action planning and to be empowered with the autonomy to choose or design the learning activities.

Some participants admitted that they endeavored to create more capacity for students to achieve that goal; however, it did not work effectively all the time owing to the constraint of time. Dina and Mary made impressive efforts to scaffold a collaborative environment for their students. Moving beyond a fragmented module or unit, both participants organized their classes in project- or task-based ones. Students were enlightened in their dual identity as a professional and as an individual through their participation in the activities of co-designing class structure, reading materials, and assignments.

Collaborative learning groups depicted in the literature may be too idealistic. In my findings only one or two participants' classes organized in groups could represent such characteristics as D. W. Johnson and F. P. Johnson's (1997), Sackney and Mitchell (2000) proposed. Most participants failed to forge such authentic collaborative groups in many situations because of constrained time, the nature of assignments, and participants' limited cognition of collaboration. It was evident in the literature of learning theories that authentic learning often emerged at informal occasions. Wenger (1998) observed that learning took the informal form in most cases, which was named "learning in practice." It was through the informal process that authentic learning was triggered and defined the development of human beings. Whereas, the findings demonstrated only a few participants endeavored to create more out-of-conventional-classes opportunities in their teaching practices to engage students in learning, although most participants recognized informal learning occasions were valuable.

Summary of Collaboration

More significant consistencies and discrepancies converged in the discussion of collaboration. Although all participants understood that collaboration came out of a close group relationship, some of them merely regarded collaboration as an isolated strategy to be adopted in some tasks. This perception of collaboration contradicts some of the discussion. The literature proposed that collaboration is a holistic method to design curricula, classes, and teaching activities rather than a single teaching activity. The data showed a positive finding for Dina. Her class appeared to be a collaborative community full of creative handicrafts, dialogues, conferences, and agendas.

The literature also suggested that collaboration may occur at multiple levels and that more able students should mentor and coach their classmates in learning activities. Echoing the literature, all participants acknowledged the existence of bi-level structures of collaboration in the classes. The participants described their teaching practices to enable students to complete tasks in coordination.

More than half of these participants still adopted a "fit-for-all" approach to enhance collaboration. This approach, as D. W. Johnson and F. P. Johnson's (1997) depicted, highlights instruction theory, the role of teachers, and objective curriculum materials. The notion of "fit-for-all" approach stayed at the simplistic level of group work, while collaboration goes far beyond group work. Although some participants stated they endeavored to empower students to design learning activities, they admitted it was not so successful due to time constraints. Collaborative learning groups discussed in the literature seem idealistic. Most participants failed to enhance collaboration in their teaching activities due to time constraints, the nature of assignments, and their own beliefs in the notion of collaboration.

Problem Solving

To ensure the fostering of problem solving, A. Herrington and J. Herrington (2006) focused on several elements: necessary resources, collaborative group, authentic teaching materials embodying real world experiences, a real problem or a real case as the goal for the group, problematic and ill-structured context, and collective actions or plans to address the problem or the case. Their theory stressed that students do not have all the knowledge required to solve problems. Rather, students are motivated to seek an understanding of the case and to address the defi-

ciency in their existing knowledge. The theory of A. Herrington and J. Herrington were confirmed in my study. As the findings suggested, it was a common practice for the participants to assist students to define a problem by building up the linkage between social or scientific problems and theoretical frameworks or scientific models.

Most participants required students to solve problems by presenting them with well-built models or frameworks. Some participants focused on the individual achievement of a student's problem solving process. Yet, not enough deliberate efforts were taken to address the collaboration process among students in the problem solving activity. Nor were sufficient efforts made to ensure that students addressed a problem in an ill-structured context, although some opportunities were provided for students to define problems, decide on resources needed, and develop plans to solve them in collaboration. Conversely, what Dina and Mary did to help students define a problem differed from the others. Both of them placed students in a real context with problems and then motivated them to identify problems. This way of teaching could be called "deductive teaching."

There were also conflicting perspectives about authentic teaching materials. These conflicting perspectives were related to expert performance. It was inspiring that most participants recognized the value of authenticity in teaching materials and applied it in their teaching practices by deploying various means of media, field study, participant observation, and guest speakers. Those participants held beliefs akin to A. Herrington and J. Herrington (2006), asserting that students should be exposed to authentic scenarios, because it would encourage students to solve complex and ill-defined problems and enhance their ability to reflect on their professional practice. This process enabled students to solve new professional problems on an ongoing basis.

Nevertheless, most classes of some participants were traditional as Ramsden (2003) described in which university education is delivered in fragmented modules and sections containing pre-determined and discipline-specific content. However, three participants adopted innovative approaches to deliver their teaching. Amber organized her teaching in consistent modules relevant to students' assignments instead of isolated textbook units. Dina and Mary's classes were primarily collaboration-apt and the material was delivered through group work. The two participants acted more like co-learners with their students in the authentic activities for problem solving. They stated in their teaching philosophies that they focused on the nurturance of students' problem solving ability collaboratively and independently, as well.

A. Herrington and J. Herrington (2006) advocated that the courses, and the teaching and learning activities designed in universities should be rich in the elements of life reality, complexity, and time sustainability. The same notion was expressed by Ramsden (2003) that courses should be delivered in a holistic manner with ill-structure problems or imperfect solutions rather than in fragmented modules and sections of pre-determine and discipline-specific content. Jonassen (1997) and A. Herrington and J. Herrington (2006) asserted that there are primarily ill-structured and well-structured problems in a problematic world.

Well-structured problems are predictable problems with a preferable and pre-determined solution process, engaging the application of constrained concepts and principles that have been presented prior to a problem. Well-structured problems mostly occur in schools with limited relevance with real-world practice. But, an ill-structured problem is probably situated in a specific context of everyday practice. Ill-structured problems typically incorporate contradictory evidence and perspectives; therefore, it is impossible to prescribe a single, correct solution to an ill-structured problem. Rather, several solutions to a problem may emerge after learners have understood various perspectives and evidence about that context and the resulting problem (Jonassen, 1997). Jonassen believed that learners will frame their own mental model of the problem and the context when going through the creative solution process. Learners meet an "ill-structured problem" before they receive any instruction. In the place of “covering the curriculum,” learners probe deeply into issues searching for connections, grappling with complexity, and using knowledge to fashion solutions. As with real problems, students encountering ill-structured problems will not have much relevant information needed to solve the problem at the outset. Nor will they know exactly what actions are required for resolution. After they try to solve the problem, the definition of the problem may change. And even after they propose a solution, students may never be sure they have made the right decision. They will have had the experience of having to make the best possible decision based on the information at hand.

In the study, my initial research assumption was that my participants would apply ill-structured attributes to the problem solving process; however, the data suggested that most problems used by the professors were well-structured problems. My findings disclosed that two participants’ teaching was primarily traditional lecture format based on an individual unit or module; two other participants blended a problem-based approach in their teaching. Although there were tasks such as lab experiments, field work, and team projects that were incorporated in the teach-

ing, the proportion was below the level that Ramsden (2003) and A. Herrington and J. Herrington (2006) advocated.

In the social sciences, both Nick and Jeremy geared their teaching toward the development of problem solving by assisting students to build the linkage between social problems and theoretical frameworks. Jeremy always encouraged his students to identify social problems, to adopt or establish a theoretical framework, and then to figure out how to solve the problems grounded in the relevant theoretical framework. Nick encouraged students to do field research work to conduct the actual surveys in order to learn the research methods not only through lectures but also through practice. In the natural sciences, Amber and Christ also required their students to predict effects of drugs, drawing upon the previously presented models and knowledge gained in class. It seemed that many problems in the natural sciences had more well-structured attributes than ill-structured attributes, in view of the disciplinary characteristics. However, in most social sciences, the primary goal should be to "create a dynamic world for diverse interpretations and solutions" (Jeremy).

In accordance with the ideas about critical thinking and collaboration, Jonassen (1997) and A. Herrington and J. Herrington (2006) valued expert performance and the modeling process of problem solution. They believed that experts, compared with novices, "possess more highly developed problems schemas because they represent problems physically in terms of real world mechanisms, which makes the problem more meaningful, easier to check for errors, and easier to define" (Jonassen, 1997, p. 79). Most participants adhered to this perspective. They adopted various methods of video, case studies, field studies, guest speakers, to expose students to the context of expert performance. Dina acted as a model, thinking aloud with students and conducting desired behaviors that she wanted their students to use. She endeavored to familiarize her students with meta-cognitive questions such as "what's going on here? What do we need to know more about? What did we do during the problem that was effective?" Then students were prompted to use those questions and to take on the responsibility for solving the problem. As time went on, students became self-directed learners.

Summary of Problem Solving

The literature specified some fundamental elements that should be incorporated in an authentic problem solving process: necessary resources, a collaborative group, authentic teaching

materials embodying real world experiences, a real problem or a real case as the goal for the group, a problematic and ill-structured context, and collective actions or plans to address the problem or the case. Consistencies and discrepancies occurred between the perceptions of participants and the views in the literature concerning these elements.

Most participants in their teaching practice presented their students with well-structured models in the problem solving process. Not enough efforts were taken to address the collaboration process among students or a problematic context. Most classes of some participants were delivered in single modules and sections containing pre-determined and discipline-specific content. The literature valued the role of expert performance in the cultivation of problem solving. In accordance with the theories in the literature, most participants adopted various methods of video, case study, field study, and guest speakers, to expose students in the context of expert performance. However, less than half of the participants blended authentic problem solving activities in their teaching. In contrast, some participants placed students in the context of ill-structured problems and facilitated the collaboration of their students to address problems.

Significance of Technology in the Cultivation of Authentic Learning Process

The significance of technology in the participants' perceptions about their teaching practices was an unexpected finding in my study. The Second Planning Cycle of University of Saskatchewan (2007) referred to the importance of technology in boosting the learning outcomes of students, although it failed to specify how the technology should be adopted and blended in teaching towards the purpose of enhancing critical thinking, problem solving, and collaboration. The issue of technology was not the focus of my study; however, the new finding indeed enlightened me on the question of the role of technology in authentic learning environments.

Most participants reported that technology was a vital tool in enhancing students' abilities of critical thinking, problem solving, and collaboration. Some participants were passionate technology users, who succeeded in integrating more technological elements in their teaching in order to design a more diverse and harmonious learning environment for students. Four participants expressed interest in experimenting with new technology in their classes. Mary defined her class as a "paperless" class with abundant of technology characteristics. Both Dina and Mary utilized WebCT, and PAWS discussion groups to create and present an alternate real context for

students to observe professionals' performance and diverse perspectives. They were confident that technology augmented communication among students.

Although the Internet and videos were popular technological means in most participants' teaching, the preference of new teaching methods relied on participants' perceptions about the extent to which new methods contributed to their teaching. Still, there were two participants who expressed their concerns about too much exposure to the Internet. The popular culture and massive amount of information available on the Internet may hamper students' independent thinking and collaboration with others. For example, Jeremy was in favor of the idea of "localized knowledge" that was situated in daily life contexts, which was believed to be preventive for the prevailing popular culture. However, these two participants expressed their interest in learning to adopt more technological methods in their future teaching.

Summary of Technology

Technology was a new finding in my study that would enlighten me on the role of technology in authentic learning environments. There were two strands in the perceptions about technology. Some participants were passionate about various media: PowerPoint slides, radios, CDs, Videos, and the Internet. Those participants created online communicative interfaces to expand the capacity for communication between them and their students. The participants in this strand claimed that technology was a necessary tool to enhance students' abilities of critical thinking, problem solving, and collaboration. In contrast, other participants held different attitudes towards technology. They were concerned that the popular culture and the massive amount of information presented on the Internet may hamper students' independent thinking and face-to-face collaboration with human beings.

Review of Research Questions

In the above sections of Authentic Learning, Critical Thinking, Collaboration, Problem Solving, and Significance of Technology in the Cultivation of the Authentic Learning Process, I addressed the consistency and discrepancy between the literature and my study's findings. I also addressed the consistency and discrepancy between the teaching philosophies and the practices described in the data. For the purpose of review, I synthesize below the key findings pertinent to my two research questions.

Research Question # 1: Participants' Perceptions of Teaching Philosophies

The first research question was to probe university professors' teaching philosophies about authentic learning in terms of critical thinking, problem solving, and collaboration. Authentic learning was understood by all the participants as a process incorporating three fundamental attributes of critical thinking, problem solving, and collaboration. I found that the three attributes interacted with one another and could not be discussed in isolation. This understanding is consistent with my research assumption.

Furthermore, the participants expanded the connotations of authentic learning. Authentic learning is a life-long learning process, because it comes from the constant construction of current knowledge when people go through the process of exploring, communicating, understanding, and building their connection with the world around them. In addition, the participants stated that learning becomes an "authentic" process only if learning takes place in a collaborative group and is situated in real contexts with access to diverse perspectives and students' life experiences. It is noticeable that all the participants positively acknowledged the contribution of technology (PowerPoint presentation, radios, CDs, videos, and the Internet) in enhancing an authentic learning process. However, the participants' opinions varied on the extent of technology adoption in the teaching practices.

Basically, the participants believed that critical thinking incorporated not only contextualized knowledge but also diverse perspectives. Contextualized knowledge is the key for critical thinking and students' critical thinking ability would be enhanced if students were exposed to a context with relevance to their pre-existing knowledge and experiences. All the participants also acknowledged that the access to different perspectives in varying contexts was beneficial for the promotion of students' critical thinking ability. Critical thinking exhibited the ability to acknowledge, understand perspectives contrary to one's own, challenge formulated assumptions, and build independent perspectives of a phenomenon. A participant (Dina) preferred the term "beliefs" when referring to critical thinking. She contended that the ability of students to articulate their unique beliefs in real life practices should be the core of critical thinking. Apart from contextualized knowledge and different perspectives, critical thinking possessed another connotation: collaboration. All the participants recognized that students' critical thinking ability would be reinforced if they collaborated with their classmates when working on a task.

All the participants identified the opportunity to observe expert performance and modeling process in a real context as a fundamental attribute of problem solving. The authenticity of teaching materials was crucial to the access to expert performance. Most participants believed that various means of media, field study, participant observation, and guest speakers enhanced the authenticity of teaching materials by reproducing or duplicating how the professionals dealt with problems in real scenarios.

The participants further claimed that collaboration would reinforce the problem solving ability among students because students would be able to be immersed in diverse perspectives and mutual interactions in a collaborative team. Some participants asserted that the design of problems was another crucial attribute to problem solving skill, because the ill-structured problems would optimize the development of their problem solving ability. However, some participants failed to recognize the difference between well- and ill-structured problems.

The perceptions of participants were conflicting when it came to the levels of collaboration. According to the participants' perspectives, collaboration emerged as two levels: collaboration between the students as a collectivity and the instructor, and collaboration among students. Although the participants favored one over the other or held a neutral stand, they all admitted that learning outcomes would be more successful if students were able to form their own cohorts either formally or informally. Dialogue was highlighted by all the participants as a key strategy when stating their philosophical perceptions on collaboration. The participants believed that collegial and professional conversations in collaborative learning groups created more capacity for students to reflect from diverse views, to understand others' positions, to learn from each other, to transform their disparity in knowledge, and to apply their evolved knowledge in real life contexts.

The participants' perceptions suggested that the true meaning of collaboration lie in a close group relationship in which all co-learners would share, rely on one another, solve problems in coordinated efforts, and become open to new thinking and perspectives. When it came down to their roles played in the carefully wrought process of collaboration, all participants tended to consider themselves as a resource person and facilitator. In addition, half of the participants consciously realized that teachers must design and facilitate the teaching process with proper pacing to help transform students into the masters and inventors of their own collaborative learning.

Research Question # 2: Participants' Perceptions of Teaching Practices

The second research question probed university professors' descriptions of their teaching practices in relation to critical thinking, problem solving, and collaboration. Consistency and discrepancy emerged as a result between teaching philosophies and practices.

According to their descriptions, most participants adopted various means such as group discussions or debates, videos, guest lectures, field studies, case studies, to present various real-life contexts and perspectives to assist students to develop critical thinking. As the perceptions of the participants implied, critical thinking bore dual significance: collaboration and independence. The participants encouraged students to voice their opinions in pair or group discussions, so that students would get alternate ideas "that are contradictory to their own and they tend to remember those ideas" (Jeremy) to enhance collaboration among peers.

Also, dialogue that included conflicting opinions established a dynamic environment for students to understand a phenomenon from multiple perspectives. As to the second connotation, critical thinking entailed independent thinking and decision making ability. In this sense, participants described that they deliberately helped their students not only attend to what the literature discussed but also what the minority argued over a certain phenomenon. In addition, two participants suggested that careful design of question and discussion was crucial in the process of fostering students' critical thinking. These two participants structured students' discussions with explicit steps or strategies; however, such awareness of discussion design was not prominent in other participants' descriptions.

Likewise, most participants adopted various methods of video, case study, field study, and guest speakers, to expose students in the context of expert performance. As the findings showed, it was a common practice for the participants to assist students to define a problem by building the linkage between social or scientific problems and theoretical frameworks or scientific models. Most participants required students to solve problems by using pre-structured models or frameworks. There was a perceived lack of deliberate effort addressing collaboration among students in the problem solving process. The data showed that little effort was made to ensure that students addressed a problem in an ill-structured context, although some opportunities were provided for students to define problems, decide on resources, and set up plans to solve them in collaboration. To contrast, some professors described placing students in a real context of problems to motivate them to identify problems.

In their teaching practices, all the participants described their efforts to forge collaboration in their classroom, although the scale of collaborative activities varied with each participant. Many participants described supporting students to set up regular conferences and agendas for group discussions regarding such issues as selecting how to accomplish a particular task, selecting different roles that every group member would play, and selecting resources the group might need. Dina and Mary paid attention to the proper pace of enhancing collaboration among students by carefully allocating the proportion of individual and collective components in students' assignments.

There existed inconsistency between the participants' philosophies and practices when talking about collaboration. More than half of participants did not adopt collaboration as a pedagogical teaching method; instead, they treated collaboration as a special strategy utilized in some tasks. These participants adopted a "fit-for-all" approach to enhance collaboration, simply putting students together to complete a task. All participants reported that the reasons for their failure to forge an intensely collaborative group came from constrained time, the nature of assignments, and the participants' cognition of collaboration.

Summary of Review of Research Questions

It was evident that the backgrounds of participants such as discipline taught, class size, teaching level, and administrative position exerted influence on the perceptions about philosophies and activities in relation to critical thinking, problem solving, and collaboration. More variations occurred on the description of collaboration as the findings suggested. In addition, teaching practices and ideology do not always keep pace with each other. Consequently, some discrepancies emerged between the participants' teaching philosophies and practices.

Summary of Discussions

In summary, the discrepancy between my research findings and the literature primarily existed in the conflicting perceptions of teaching practices in relation to collaboration and problem solving. Collaboration was the most important area in literature with reference to authentic learning; however, the findings in my study suggested that participants' understandings of the significance of collaboration contributing to their teaching varied greatly. As a result, the participants' teaching practices concerning collaboration varied to some extent. Technology was an unexpected finding in my study.

As suggested by the data, most participants described that the blending of technology in their teaching practices reinforced the cultivation of critical thinking, problem solving, and collaboration. This finding also brought new insights in the role of technology in the enhancement of learning abilities. Implications for future research and teaching rendered from the discussions are presented in the next section.

Implications for Future Research and Teaching

I observed that the participants' philosophical understandings of their teaching was in accordance with some of the literature; while there were some inconsistencies between the literature and the participants' perceptions. The reasons for these inconsistencies are: first, an action or a behavior when expressed in real teaching practices may not always be consistent with one's assumptions. Second, people's world views may be confined to some extent. Third, some substantial circumstances may restrain the implementation and articulation of revolutionary thinking.

Some issues stood out while I was analyzing the perceptions of the participants, the prominent ones among which were Dina's "belief" system, and Mary' and Dina's perspective on constructivism. I realized, after my data analysis, that one participant embraced constructivism as a philosophy. She was committed to applying her beliefs into transforming her students. Dina's beliefs influenced her teaching activities in relation to developing her students' critical thinking, problem solving, and collaboration skills. Her "belief" surfaced prominently in the study. She believed that people's thinking was directed by their core beliefs and that action was structured by beliefs.

In her descriptions about how the beliefs influenced the process of transforming students, I gradually developed the idea that Dina tried to convey how implicit and explicit beliefs interacted and changed the behavior of students. The literature presented in Chapter Two referred to perspective transformation and outlined the steps for teachers to transform their students' perspectives (McGonigal, 2007). Yet, McGonigal did not touch upon the construction of human beliefs. Dina's descriptions demonstrated how beliefs influenced the transformation of people's behaviors.

Tillema (2000) suggested it in his research that given a belief can be conscious (explicit) or unconscious (implicit), the explicit belief is an expression of the implicit belief in a world of real objects and the implicit belief shapes the process that leads to the expression. That is, if a

belief is crucial in driving a purposeful action in teaching, this belief incorporates the knowledge about the nature, behavior, and environment concerning learning, and other objects grounded in personal experiences. Tillema's ideas were reflected in Dina's teaching activities that were framed by her belief in "relationships, being fair and equal, and learning from experiences."

Vygotsky (1981) in Cole and Wertsch (1996) provided a rationale explaining Dina's belief, advocating that such semiotic means as works of art, writings, drawings, maps, and diagrams could facilitate the co-construction of knowledge and aid future problem-solving. Another sociocognitivist, Piaget (1985) (cited in Cole & Wertsch, 1996) contended that contradiction between the learner's pre-existing understanding and what the learner experiences will, in turn, contribute to the process of questioning the existent beliefs, and will prompt him or her to try out new ideas.

In some sense, the notion of "beliefs" has proffered another theoretical perspective of conducting research in teaching and learning endeavors, which suggested the significance of research on the relationships between teachers' beliefs and knowledge, and their effect on subsequent classroom behavior. Specifically, are teachers' beliefs consistent with their pedagogical knowledge? Is there any other factor that influences teacher's work such as the social context in which teaching takes place, including the values, beliefs, and expectations of peers, academic administrators, and students?

According to my interpretation, the concept of constructivism was not a trendy expression for Dina and Mary. Rather, their constructivist perspective seemed to serve as an overarching theme that guided their diverse views in terms of critical thinking, the constructive process of learning (rather than the acquisition of objective knowledge), and their teaching activities with the purpose of facilitating students to construct their context understandings in a community. Grounded in their constructivist perspective, the purpose of teaching was to motivate students to understand diverse opinions and to challenge their pre-existing thinking. Their descriptions of constructivism went far beyond my study; however, the perceptions of Dina and Mary opened a door for me, a novice researcher, to explore the concept of constructivist.

An essential component of the constructive teaching of Dina and Mary was collaboration, because both of them adhered to the notion that the most rewarding learning process should take place in a community. More importantly, it was suggested in the findings that collaboration was

the key to enhance critical thinking and problem solving skills in students' learning. However, collaboration was a subtle issue in the learning process.

Most literature on learning theories placed a high demand on teachers to become transformative teachers in students' authentic learning process. For example, D. W. Johnson and F. P. Johnson (1997) proposed their collaboration model named as "growth and counseling group model", which focused on the higher hierarchy of group members' needs such as psychological welfare, healthy human relations, potential for diverse culture, sense of belonging, and interpersonal skills. This model also demanded that group leaders create conditions for the transformation of the whole group.

In contrast, teachers in their daily teaching may find it impractical to enact all the functions to become a transformative teacher. Even the most inspiring and innovative participant in my study agreed that she would not take current teaching approaches in a large size classes. All the participants, whether they were tradition-oriented or innovation-oriented in their practical teaching, pointed that time, burdens of other duties, administrative responsibilities, size of classes, and the nature of courses would all determine the level of collaboration in their classes.

Given the above elements, how will university undergraduate teaching strike a balance between the size of classes and the promotion of collaboration, critical thinking, and problem solving? What institutional or administrative support or culture is needed to positively empower professors to be teachers who sincerely attend to the nurturance of students' critical thinking, problem solving, and collaboration abilities? Further, against what criteria should collaboration in teaching activities be assessed? I believe it is worthwhile to explore the steps and strategies of teachers' scaffolding efforts to promote students' critical thinking, and problem solving abilities in a collaborative team. Another question occurred to me is what will happen in the teaching-learning process if collaboration becomes salient among professors or if possible, collaboration even takes place across different disciplines? I could not help thinking that the classroom will become totally different if this level of collaboration happened. That idea did not come into being without any evidence because, university, as many researchers advocated, should evolve into a "learning community" (Wolff, 1992). Some participants expressed the same wish that they would like to collaborate with their peers not only in the same discipline but also beyond disciplinary borders, experiencing novel perspectives and stories. One participant carried out this transformation, because she said she shared her syllabus with some peers in other universities and

found it quite rewarding. Hopefully, “learning community” will not be merely chant in the empty hall of the university.

There are more issues emerging from this study that need further exploration. Disciplinary differentiation deserves more attention in relation to specific approaches or suggestion to cater to the needs of different faculty. Some teaching practices as the participants described were the characteristic features of a particular discipline. For instance, the adoption of labs and tutorials is a typical feature of natural sciences disciplines, while the adoption of conceptual frameworks is a typical feature of social sciences. In addition, Dina and were more expressive in the process of interviews. However, their expressiveness did not imply that their perceptions of their teaching were superior to those of other participants. In some sense, the descriptions of Dina and Mary may have been noteworthy because as faculty members in Education, they may have been more familiar with such terms as “collaboration” and “community”. The significance of disciplinary differences is that they may become the reference for future research in how to successfully design an authentic learning framework for different disciplines.

The next implication is technology that has become a key component in education. I traced back the literature research while analyzing the data, and I discovered that technology was often linked with “real life” and “collaboration” whenever I typed in these words to conduct literature research online. The occurrence of vast amount of literature concerning technology implies that technology is regarded as an essential part of learning in the 21st century. The implication of technology would open a door to future research and teaching.

Finally, in this study, my focus was placed on the perceptions of university professors’ perceptions of their teaching philosophies and practices with reference to critical thinking, problem solving, and collaboration. Nevertheless, students’ perceptions of their learning experiences and teachers’ practices should also be a significant area worthy of exploring. Before the findings were generated, I had assumed that collaboration, critical thinking, and problem solving skills were parallel components in the learning process. The findings implied that collaboration, in particular collaboration among students, should be the framework for critical thinking and problem solving. Each topic deserves further investigation.

Summary of Implications

Some issues emerged while I was analyzing the perceptions of the participants. Those issues deserve e research in the future: Dina's belief construction, Mary's and Dina's perspective of constructivist teaching, disciplinary differentiation, and technology. In addition, each component of authentic learning—critical thinking, problem solving, and collaboration deserves further exploration.

Dina's belief construction influenced teaching activities in relation to critical thinking, problem solving, and collaboration skills. Her notions of "belief" complement my literature review and the study, and also suggest a new orientation for future research in teaching and learning. Mary and Dina's constructivist perspective affected their perceptions about their teaching. Grounded in their constructivist perspective, the purpose of their teaching was to motivate students to understand diverse opinions, challenge their pre-existing thinking, shape their relationship with the world, and enhance collaboration in the learning process. Collaboration was a prominent implication in the learning process. Most of the literature placed a high expectation on teachers to facilitate collaboration in learning. However, all the participants referred to factors that evidently hindered collaboration. Thus, more questions were raised about how to enhance collaboration in a teaching and learning process.

Disciplinary differences emerged in the participants' descriptions of their teaching activities. Those differences cannot be ignored because they may prompt future investigation in effective authentic learning environment designs. I found that technology was becoming prominent in the literature. It is important to probe how to utilize technology to optimize learning outcomes in teaching. The implications is that considerable work needs to be completed for the purpose of facilitating authentic learning. In my study, the existing deficiencies in the research design need to be reflected and presented. I present my reflections in the next section.

Reflections on the Study

My study was conducted from a constructivist perspective. The aim of the research design was to understand and co-construct the interpretations concerning authentic learning in undergraduate classrooms. In order to augment perceptions from diverse backgrounds, I adopted semi-structured interviews as a means to collect the data from six participants of three different colleges of the University of Saskatchewan.

It was crucial to differentiate the variety of backgrounds of participants, in that differentiation facilitated the understandings in the influence of diverse backgrounds on the individual participant's perceptions of his or her undergraduate teaching practices. Above all, the six formal semi-structured interviews generated rich data, and some participants' perceptions were worthy of further investigation. I conducted two follow-up interviews afterwards. It must be acknowledged that it was a visible limitation: only two follow-up interviews were conducted due to the other participants' schedule and my research time constraints.

Although rich data were generated, I failed in some places to probe more deeply into some participants' perceptions because of my immature interview skills. Some interview questions needed further revision as well. To become a skilled interviewer, not only the interview skills but also the ability to control the rhythm should be sharpened through rehearsals. In the end, I found that semi-structured interviewing was a powerful instrument into gain insights in a phenomenon; some other methods might have been useful to augment my data collection, such as participant observation. The research would have been more successful if I had adopted a method of classroom observation. Classroom observation would have enabled me to observe the relation between participants' teaching activities and philosophies in an authentic classroom setting.

In the stage of coding and categorizing original data, I turned to Hatch's (2002), Hancock and Algozzine's (20060 models as my reference. I went through the steps of transcribing, member checking, and identifying research question as a whole. I determined analytic categories (sociological constructs); I read through data and establish grounded categories; I studied categories for salient interpretations; and I reread the data, coding places where interpretations were supported or challenged (Hancock & Algozzine, 2006, p. 59; Hatch 2002, p. 181). I learned how to design research, in particular, I learned to design semi-structured interviews and to classify themes through this study, in spite of some pitfalls encountered in the design process. Hopefully, the pitfalls will become valuable experiences that I can refer to in future research projects.

Summary of Reflections

There were some deficiencies in the study. In the stage of data collection, I should have been probed the perceptions of some participants more deeply. Reasons for the failure were the time constraint of the participants and my schedule, and my immature interviewing skills. Some

other methods might have been useful to augment my data collection such as participant observation or classroom observation. Those methods could have helped investigate the consistency and inconsistency between the participants' teaching philosophies and practices. I learned how to design a qualitative case study through the experiences of researching. These experiences will become valuable reference for my future research.

Summary of Discussions, Implications, and Reflections

In this chapter, I presented the discussions, implications, and reflections of the research originating from the data presentation and analysis. The discussions centered around three domains of my study—critical thinking, problem solving, and collaboration; and I explored the consistency and discrepancy between the literature and the participants' perceptions of their teaching philosophies and practices.

Authentic learning and technology were the two issues to be discussed. The discrepancy between the research findings and the literature primarily lay in the conflicting perceptions of teaching practices in relation to collaboration and problem solving. Collaboration was the most important area in the literature with reference to authentic learning; however, the findings in my study suggested that participants' understandings of the significance of collaboration contributing to their teaching varied. As a result, their teaching practices concerning collaboration varied to some extent. Technology was an unexpected finding in my study. Most participants described that the blending of technology in their teaching practices reinforced the cultivation of critical thinking, problem solving, and collaboration. This finding also brought new insights regarding the role of technology in the enhancement of learning abilities.

Some implications rendered from the discussions are noteworthy for future research and teaching: Dina's belief construction; Mary's and Dina's perspective of constructive teaching; disciplinary differentiation; and technology. In addition, each component of authentic learning—critical thinking, problem solving, and collaboration may deserve further exploration. Dina's Belief Construction complemented my literature review and the study, and also struck out a new orientation for future research in teaching and learning. Mary and Dina's constructivist perspective influenced their perceptions about their teaching in terms of critical thinking, problem solving, and collaboration. Collaboration was a prominent implication in the learning process from a constructivist perspective. Most of the literature placed a high demand on teachers to facilitate

collaboration in learning. However, all the participants referred to some factors that evidently hindered collaboration. Thus, more questions were raised about how to enhance collaboration in a teaching and learning process.

There were some deficiencies in the study. In the stage of data collection, the perceptions of some participants should have been probed more deeply. Reasons for the failure were the time constraint of the participants and my schedule, and my immature interviewing skills. Some other methods might have been useful such as participant observation or classroom observation. Those methods could have helped explain the consistency and inconsistency between the participants' teaching philosophies and practices. Although the deficiencies existed, I learned how to design a qualitative case study through the experiences of researching. These experiences will become valuable reference for my future research.

Closing Remarks on the Study

In the course of data collection and analysis, I was inspired and impressed by the passion of these participants. Whenever I read their descriptions, I felt like I was the follower eager to trace the footsteps left by these educators. After reviewing their stories, I could not help pondering how I could do better in their situation. Dina, Amber, and Mary said that they were not instructing students; rather, they were attempting to develop students to be sustainably critical thinkers, problem solvers, and collaborative team workers in both their academic and future career life. From the interaction with those participants, I gradually learned that a key component of effective teaching is teachers' passion and enthusiasm. Passion and enthusiasm is a the stimulus that enables teachers to be open to new knowledge and experiences, and to be willing to try out new approaches and take risks in education. All the participants in this study demonstrated their passion through their commitments to teaching activities to address the needs of developing students' abilities with regard to critical thinking, problem solving, and collaboration.

The research enhanced my understanding of the constructive paradigm of authentic learning in university undergraduate classrooms and showed me that authentic learning was and is facilitated by professors' teaching endeavors in this university. Moreover, I can depict a clearer picture of what and how teaching activities are going on in the university across disciplines. Consequently, as suggested in the literature, learning arises through human beings' interaction with internal and external worlds. I started reflecting on my past teaching practices in the univer-

sity of China. Undoubtedly, going through the interpretation of some professors' perceptions about their teaching, this study also transformed my teaching beliefs and will transform my future teaching practices and behaviors. I was enlightened by the descriptions of approaches that were blended in their teaching. Teachers, as Dina described, are "architects". I believe the meaning of architect does not only consist in classroom teaching; it is a profession that greatly impacts on other people's life and convictions, particular by those of their students.

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APPENDIX A: LETTER OF INVITATION FOR PARTICIPANTS

Hua Shang

111-101 Cumberland Ave. S.
Saskatoon, Saskatchewan
S7N 1L5

_____

Dear _____:

I am currently completing my Master of Education in Educational Administration, University of Saskatchewan. As partial fulfillment, I am conducting a study entitled *Professors' Perceptions of Authentic Learning in Undergraduate Classrooms.* The purpose of this letter is to invite you to participate in this research study. This study will focus on your perceptions of your undergraduate teaching practices in terms of authentic learning (critical thinking, problem solving, and collaboration). Participation in this study will provide you with the opportunity to reflect upon your role as an undergraduate course instructor through the interaction of teaching and learning experiences. This research may be helpful to the wider University of Saskatchewan community by identifying an association between teaching practices and students' improved learning outcomes.

Data for this study will be collected through one individual, face-to-face, and formal semi-structured interview and possibly one follow-up semi-structured interview. A follow-up interview may be conducted after the formal semi-structured interview to seek further depth and clarification on issues or topics addressed within the initial formal interview. The interview should take approximately one hour of your time and will be scheduled at a time and location convenient to you. If you agree, each interview will be audio recorded. The interviews are intended to be relaxed in nature, and although structured questions will be formulated ahead of time, the interviews will be much like a conversation. You are free to answer only those questions with

which you are comfortable. Enclosed are a copy of first interview questions and the consent form in an envelope.

It is your right to withdraw from the research anytime. All the data audio recorded will be transcribed by me. Your responses will be kept secure and anonymous by using pseudonyms for names of participants. All the data that is collected will be securely stored and retained for a minimum of five years at the Department of Educational Administration in the College of Education, University of Saskatchewan in accordance with the University of Saskatchewan guidelines. You own the right to review and make changes in the information you provide in the interview.

Once the thesis is printed, the document will be available as a resource in Education Library, University of Saskatchewan and Department of Educational Administration Office, College of Education, University of Saskatchewan. In addition, information from this research may be used within various conferences, scholarly journals, and presentations.

My study has been approved on August of 2007 by Behavioral Research Ethics Board, University of Saskatchewan. If you are interested in learning more about this study, please contact me at (306) 261-8611 and my supervisor Dr. Bonnie Stelmach at (306) 966-7622 and more details will be provided. Any questions regarding your rights as a participant may be addressed to the Ethics Officer (966-2084).

It is my pleasure to include your personal experiences and perspectives as an active component of my research. I look forward to our conversations. Attached is a copy of the Informed Consent Form with complete details regarding this study, please review at your convenience.

Thank you in advance for your cooperation.

Sincerely,

_____

Hua Shang
Masters of Education Candidate
College of Education
University of Saskatchewan
(306) 261-8611

APPENDIX B: INFORMED CONSENT FORM

I appreciate your participation in the research study entitled *"Professors' Perceptions of Authentic Learning in Undergraduate Classrooms"*.

Please read this form carefully, and feel free to ask any additional questions you might have.

1. Research Supervisor and Researcher:

Research Supervisor
Dr. Bonnie Stelmach
Department of Educational Administration
Office ED 3069
College of Education, University of Saskatchewan
28 Campus Drive, Saskatoon, SK S7N 0X1
(306) 966-7622

Graduate Student Researcher
Hua Shang
111-101 Cumberland Ave. S.
Saskatoon, SK S7N 1L5
(306) 261-8611

2. Purpose and Procedure:

The purpose of this study is to explore university professors' perceptions of your undergraduate teaching practices in terms of authentic learning (critical thinking skills, problem solving skills, and collaborative interactions). The research question is: In what ways do university professors perceive their undergraduate teaching practices in terms of authentic learning (critical thinking, problem solving, and collaboration)? Two pertaining sub-questions will be examined: a. In what ways do professors describe their efforts to help undergraduate students become critical thinkers, problem solvers and collaborators?

b. What teaching activities do professors use to provide undergraduate students with opportunities for authentic learning? This study has been given approval by the Behavioural Research Ethics Board (Beh-REB), University of Saskatchewan on July, 2007, and also been reapproved on May 6, 2008.

Data for this study will be collected through a formal semi-structured interview (Stake, 1995) and a follow-up semi-structured interview. With your permission, there will be the potential for a follow-up interview after the formal semi-structured interview. A follow-up interview will seek further depth and clarification into issues or topics addressed within the initial formal interview.

Questions will be pre-determined for the a formal semi-structured interview (See Appendix C), and, more additional questions may be asked you in the formal semi-structured interview to probe for more information concerning the unique perceptions of participants about your teaching practices in terms of authentic learning in undergraduate. You are free to answer only those questions with which you are comfortable. The interview should take approximately one hour of your time in length and will be scheduled at a time and location convenient to you. Each interview will be audio recorded with your permission. The tape recorder may be turned off at any time as you see fit. The interviews are intended to be relaxed in nature, and although structured questions will be formulated ahead of time, the interviews will be much like a conversation. All the interview communications will be accomplished through face-to-face personal contact. It is your right to withdraw from the research anytime. All the data audio recorded will be transcribed by me. Your responses will be kept secure and anonymous by using pseudonyms for names of participants. You own the right to review and make changes in the information you provide in the interview.

3. Storage of Data:

Only the researcher and the research supervisor will have access to the research data. All the data that are collected will be securely stored for a minimum of five years in the Department of

Educational Administration in the College of Education, University of Saskatchewan in accordance with the University of Saskatchewan guidelines.

4. Dissemination of Results:

The data collected from this study will be used as partial requirements for the Degree of Master of Education in the Department of Educational Administration and will be shared with the faculty of Educational Administration at the University of Saskatchewan, and possibly published or used in articles, seminars, and conferences. Participants will be informed that at the end of the research, their contributions will be written as part of the thesis and may later be published. In respect of confidentiality, pseudonyms will be used when referring to the names of participants. Copies of the manuscript will be kept in the Education Library, College of Education and the Department of Educational Administration Office, College of Education, University of Saskatchewan.

5. Risk, Benefits, and Deception

There is minimal risk of being identified for participants due to the small participant pool and the observation aspect of the study. At the beginning of the study, participants will be informed of the purpose and the nature of the study and the reasons that they will be invited to participate. Participants will also be made aware that participation in the study is voluntary and they may withdraw at any time without penalty of any kind as a consequence of withdrawal. Participants will be informed that if they choose to withdraw from the study, their audio recordings and interview data will be destroyed. All measures will be taken to protect anonymity of participants, and pseudonyms will be used when referring to individuals in data reporting.

By exploring the perceptions of professors, this study may provide the University of Saskatchewan with a better understanding of their undergraduate teaching practices in terms of authentic learning through three dimensions of critical thinking skills, problem solving skills and collaborative interactions.

6. Confidentiality:

The participants will be informed that anonymity and confidentiality will be enhanced throughout the study by using pseudonyms. The documents containing the real names of the participants and the pseudonyms will be kept separately on the audio tapes, transcripts, analysis and any written summaries which result from this study other than the consent/assent form. Additionally, specific details which would enable a reader to deduce the participants' identifies will be made more generic.

7. Data/Transcript Release:

Interview transcripts and data/transcript release forms will be mailed to all interviewed participants. They will have an opportunity to review, revise, add or delete the final transcript and sign a transcript release form to acknowledge that the transcript accurately reflects what they said or intended to say (see Appendix D). Also, these signed release forms will be mailed back to me in self-addressed envelopes with which I will provide the participants.

8. Debriefing and Feedback:

Participants will be advised that the University of Saskatchewan will receive a copy of the completed research thesis; and upon request, participants will receive an executive summary.

9. Questions:

If at any point you have questions concerning the study, please feel free to contact myself at (306)261-8611.
Or, my supervisor, Dr.Bonnie Stelmach at (306)966-7622.
This study has been approved by the Behavioral Research Ethics Board, University of Saskatchewan on August of 2007. Any questions regarding your rights as a participant in the study may be addressed to the Ethics Officer at (306)966-2084. Out of town participants may call collect.

10. Consent of Participate:

I have read and understood the description provided above; I have been provided with opportunities to ask questions and my questions have been answered satisfactorily. I consent to I participate in the study described above, understanding that I may withdraw this consent at any time without cause or penalty. A copy of this consent form has been given to me for my records.

_____	_____
(Name of Participant)	(Date)
_____	_____
(Signature of Participant)	(Signature of Researcher)

APPENDIX C: INTERVIEW QUESTIONS

Thank you for taking the time to participate in this interview. The interview may last about an hour. Please take it as a conversation related to your experiences in undergraduate teaching.

Introductory Question:

To start with, let's talk about how long you have been teaching undergraduate students and what subjects your teaching usually cover? And, is there any experience that most impressed you in your time of teaching? If yes, would you describe the experience?

1. What abilities and skills should be fostered among students? How do you understand the fostering of skill of problem solving and critical thinking in your teaching?

1.1 What are the goals for your teaching and learning?

1.2 What are the teaching and learning styles in your context? Will you please describe the characteristics of the style?

1.3 In your opinion, what consists of effective/excellent teaching? What learning outcomes do you consider to be successful?

2. How do you perceive the relation between your and your students at classroom? For example, boss, friend, a resource person, and etc.

2.1 How do you describe the atmosphere of teaching and learning? How do you treat the risk taking (i.e. new teaching methodology) behavior through the teaching and learning process?

2.2 How does the relationship (between students and you) influence your teaching and students learning achievements or goals?

3.

3.1 Are there any learning activities related to problem-solving and critical thinking? Will you please describe how such activities are contributed to the skills of problem-solving and critical thinking?

3.2 If any problem concerning a subject or learning occurs at your class, how do you usually settle it? For example, you will provide the correct answer for students or ask students to find out the answer to it?

3.3 How do you usually present a theory or concept to students? How can that theory be linked to students' tasks or their real life?

3.4 In your classroom, do your students tend to argue with you about a conception you hold or they tend to accept what you talk about? Will you please tell me what leads to it?

3.5 How do you and your students usually deal with students' diverse perspectives of a phenomenon or a concept in your class? Is there opportunity for students to examine their perspectives? What is the opportunity?

APPENDIX D: TRANSCRIPTS RELEASE FORM

Title: Professors' Perceptions of Authentic Learning in Undergraduate Classrooms

I, _____, have reviewed the complete transcript of my personal interview in this study, and have been provided with the opportunity to add, alter, and delete information from the transcript as appropriate. I acknowledge that the transcript accurately reflects what I said in my personal interview with Hua SHANG. I hereby authorize the release of this transcript to Hua SHANG to be used in the manner described in the consent form. I have received a copy of this Data/Transcript Release Form for my own records.

_____	_____
Name of Participant	Date
_____	_____
Signature of Participant	Signature of researcher

APPENDIX E: ETHICS APPROVAL

UNIVERSITY OF SASKATCHEWAN

Behavioural Research Ethics Board (Beh-REB)

Certificate of Re-Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	Beh #
Bonnie Stelmach	Educational Administration	07-103

INSTITUTION (S) WHERE RESEARCH WILL BE CARRIED OUT

University of Saskatchewan
Saskatoon SK

STUDENT RESEARCHER(S)

Hua Shang

SPONSORING AGENCIES

UNFUNDED

TITLE:

Professors' Perceptions of Authentic Learning in Undergraduate Classes

RE-APPROVED ON	EXPIRY DATE
06-May-2008	02-Jun-2009

Full Board Meeting ☐

Delegated Review ☑

CERTIFICATION

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS

In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: http://www.usask.ca/research/ethics_review/

John Rigby, Chair
University of Saskatchewan
Behavioural Research Ethics Board

Please send all correspondence to:

Ethics Office
University of Saskatchewan
Room 302 Kirk Hall, 117 Science Place
Saskatoon, SK S7N 5C8
Phone: (306) 966-2975 Fax: (306) 966-2069