

ATHABASCA UNIVERSITY

THE RELATIONSHIP BETWEEN LEARNING STYLE AND STUDENT
SUCCESS IN A DISTANCE EDUCATION PROGRAM

BY

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TABLE OF CONTENTS

ABSTRACT.....	7
CHAPTER 1: THE PROBLEM.....	9
INTRODUCTION.....	9
BACKGROUND OF THE STUDY	9
LEARNING STYLES OF DISTANCE EDUCATION STUDENTS	12
STATEMENT OF THE PROBLEM	13
RESEARCH CONTEXT.....	15
RESEARCH QUESTION	17
DELIMITATIONS.....	18
DEFINITION OF TERMS.....	18
ASSUMPTIONS	20
SIGNIFICANCE OF THIS STUDY TO DISTANCE EDUCATION	21
CHAPTER 2: REVIEW OF LITERATURE	23
THEORETICAL FOUNDATIONS.....	23
CURRY’S REVIEW OF LEARNING STYLE INVENTORIES.....	24
EXPERIENTIAL LEARNING AS A FRAMEWORK.....	25
KOLB’S LEARNING STYLE INVENTORY	32
CRITIQUE OF THE KOLB LSI.....	34
LEARNING STYLES AND THE MYERS-BRIGGS TYPE INDICATOR	38
SIMILARITIES BETWEEN KOLB LSI AND THE MBTI	40
SUMMARY OF LEARNING STYLE INVENTORIES.....	41
RESEARCH STUDIES USING LEARNING STYLES INVENTORIES	42

LEARNING STYLES AND DISTANCE EDUCATION.....	43
THE STATE OF KNOWLEDGE ON LEARNING STYLES	45
PERSONALITY THEORY AND LEARNING STYLE.....	47
SUMMARY.....	47
CHAPTER 3: METHODOLOGY	49
RESEARCH DESIGN.....	49
PROCEDURE	50
APPARATUS.....	51
ETHICAL TREATMENT OF HUMAN SUBJECTS	52
PARTICIPANTS.....	52
DATA COLLECTION	53
CHAPTER 4: DATA ANALYSIS.....	55
LEARNING STYLE AND LEARNING OUTCOMES	57
APPLICABILITY OF LEARNING TO WORK.....	58
APPLICATION OF WORK TO LEARNING EXPERIENCE	59
REASONS FOR CHOOSING DISTANCE EDUCATION	60
CHALLENGES OF DISTANCE LEARNING	61
COURSE DELIVERY AND LEARNING STYLE FIT	62
TELE-CLASSES AS A LEARNING TOOL.....	63
REFLECTIVE JOURNAL TO DEEPEN UNDERSTANDING OF LEARNING CONCEPTS.....	64
PARTICIPANTS PERCEIVED ACCURACY OF LEARNING STYLE INVENTORY	65
SUMMARY.....	67
CHAPTER 5: SUMMARY, DISCUSSION AND RECOMMENDATIONS.....	68
LEARNING STYLE AND LEARNING OUTCOME.....	68

STRATEGIES FOR MEETING THE LEARNING OBJECTIVES OF THE PROGRAM	71
HOW INSTRUCTORS FACILITATE LEARNING OUTCOMES	74
HOW THE RESULTS RELATE TO PREVIOUS STUDIES.....	77
LIMITATIONS.....	80
RECOMMENDATIONS FOR PRACTICE	83
RECOMMENDATIONS FOR FURTHER RESEARCH.....	84
REFERENCES:.....	88
APPENDIX A -- E-MAIL SIGNATURE OF THESIS SUPERVISOR:.....	102
APPENDIX B --KOLB LSI AND SCORING KEY (THE CYCLE OF LEARNING).....	103
APPENDIX C--EVIDENCE OF SUPPORT:	106
APPENDIX D—INVITATION TO PARTICIPATE IN RESEARCH STUDY	108
APPENDIX E--TELEPHONE INTERVIEW PROTOCOL	112
APPENDIX F--QUESTIONS INCLUDED IN TELEPHONE INTERVIEW	112

TABLE OF FIGURES

FIGURE 1 THE LEWINIAN EXPERIENTIAL MODEL	27
FIGURE 2 LEARNER CHARACTERISTICS AND OTHER FACTORS AFFECTING LEARNING	37

ABSTRACT

Learning styles theory has contributed to educational research in that the various measurements of learning style provide a framework on which to create learning models that may contribute to student success for the largest number of students in a variety of settings. The purpose of this study was to explore the relationship between learning style and student success in a distance education program of studies. I examined the ways that distance educators can assist students with diverse learning styles and suggested how one method of measuring learning style can provide possible solutions to compensate for learning style differences. Using the Kolb learning style inventory to measure the various ways that students learn, I then explored the impact of their learning style on their ability to participate in a distance education program of studies.

A case study methodology was employed. Participants in this study included students participating in a diploma program in a community college in Southwestern Ontario. Individuals who agreed to participate in the study were given the Kolb LSI by mail or by fax. Once they completed the learning style inventory participants were interviewed by telephone to elicit their thoughts on how they were able to achieve positive learning outcomes in the distance learning environment. An analysis of the resulting interview transcripts was then conducted to gain a deeper understanding of the recurring themes that emerged.

One result was that many participants related strategies that they had learned from their studies which were transferrable to the work that they did. Although this was not found to relate directly to learning style, it does relate to the experiential learning cycle developed by Kolb which is a basis of his learning style theory.

Based on the results of this study, understanding how individuals use their learning style to complete their distance education course is one tool that can offer some insight into student success.

CHAPTER 1: THE PROBLEM

Introduction

The different ways which individuals grasp learning concepts presents both a challenge and an opportunity for distance education instructors. The challenge is facilitating the learning objectives of the course while meeting the diverse learning styles of the students. The opportunity presented to the distance educator by the knowledge of the diversity of student learning styles, is that instruction can be diversified to accommodate for the variety of learning styles. The purpose of this study was to examine the ways that distance educators can assist students with diverse learning styles and suggest how one method of measuring learning style can provide possible solutions to compensate for learning style differences. In this study I began with a general discussion of the concept of learning styles followed by a review of the literature pertaining to the differing learning styles of students participating in on-campus and distance education programmes of study. Using the Kolb learning style inventory to measure the various ways that students learn, I then explored the impact of their learning style on their ability to participate in a distance education program of studies. Based on my results of the study I conclude with some recommendations on how to accommodate for learning style differences among distance learners and suggest areas for further research.

Background of the Study

The individual difference in the way that we learn is an ongoing interest to educators (Curry, 1987; Cassidy, 2004). This interest in the differing approaches to learning has led to the development of learning style theories and correspondingly instruments to measure learning style. Examples of learning style inventories include: Reichmann and Grasha's Style of Learning Interaction Model (1974) which measures the level and type of interaction;

Gregorc's Style Delineator (1982) which measures cognitive personality dimensions of learning style; the Kolb Learning Style Inventory (1985) which measures information processing methods; Honey and Mumford's (1982) learning styles questionnaire which is similar to the Kolb Learning style inventory (LSI); and Felder and Solomon's Inventory of Learning Styles (1996) which measures personality. These learning style inventories are used as tools to measure differences such as personality, preferred method of processing information and the environmental needs of learners.

Learning style inventories which are used to determine how learners process information provide good evidence to suggest that information processing reflects the relationship between the way we prefer to think, to solve problems, and to remember information (Gick, 1986). The information processing element of learning style was introduced by Kolb (1984) when he described the two ways that individuals prefer to process information. According to Kolb we either prefer to rely on concrete experience or abstract conceptualization to process new information. Individuals who use concrete experience rely on their ability to make tangible connections to the new learning concept. Individuals who rely on abstract conceptualization "create concepts that integrate their observations into logically sound theories" (Kolb, 1984, p. 30). Learning takes place when we are able to transform what we have learned. This is referred to as the communicative dimension of Kolb's LSI (1984). This dimension of Kolb's LSI measures how we transform information processed to incorporate it with our previous knowledge by either actively or reflectively engaging with the learning materials. According to Kolb, if we prefer to use active experimentation to transform our learning experience then we use theory to make decisions and solve problems. If we prefer to use reflective observation, then we would reflect on and observe new information from many perspectives.

There has been much debate as to whether learning style is a preferred way of processing (state) or if a learning style is a characteristic way of behaving in a learning situation (trait) (Cassidy, 2004; Dillon, Greene, & Mansell, 2005). Cassidy's (2004) view of the state/trait debate describes learning style as "stable over time (structural) - a trait- or as changing with each experience or situation (process) - a state" (Cassidy, p. 421). Kolb (1984) describes his theory on learning style as a process, suggesting that individuals can move through various stages of learning. In addition, his learning style inventory measures learning style as a construct which is adaptable, thus supporting the state theory of learning style. Individuals can move from reflection, to abstract conceptualization of learning problems, to active experimentation with possible solutions and integrate it into their concrete experiences. Kolb (1984) refers to this as the experiential learning cycle. According to Kolb, individuals have a typical way of processing information that can begin anywhere in the experiential learning cycle and one of the roles of the teacher is to encourage the individual to work their way around the cycle of learning.

Much of the literature on learning styles uses the terms cognitive style and learning style interchangeably (Liu & Ginther, 1999; Wilson, 1998; Cassidy, 2004). According to Liu and Ginther (1999), the difference is that "cognitive styles are more related to theoretical or academic research while learning styles are more related to practical applications" (p.2). As well, cognitive style can be seen as a relatively stable measure of the way that an individual processes learning materials. Cognitive style is often bipolar whereas learning style usually measures multidimensional factors. Some of these multidimensional factors can include: sensory preferences such as verbaliser/visualizer (Paivio, 1971) and Kolb's (1984) four dimensional instrument of abstract conceptualization/concrete experience and active

experimentation/reflective observation. An example of a bipolar cognitive style instrument is field dependant vs. field independent (Witkin, 1979).

Learning Styles of Distance Education Students

The learning styles of students in an on campus setting may differ from the learning styles of distance education (DE) students in several ways (Papp, 2001; Diaz & Cartnal, 1999). One of the ways that distance education students may differ from on campus students is that the former may be more independent learners. In a research study by Diaz and Cartnal (1999) the Reichmann-Grasha learning style inventory (1974) was administered to students studying the same course in both an on-campus classroom and in a distance education environment. The Reichmann-Grasha inventory measures dependency vs. independency as one of the dimensions of learning style. According to Diaz and Cartnal (1999) independent students prefer independent study, self-paced instruction, and would prefer to work alone on course projects than with other students. Conversely, dependant students rely on the teacher and their peers as a source of structure and guidance and prefer an authority figure to tell them what to do. According to the results of a research study by Diaz and Cartnal (1999) the students studying in the DE learning environment had a more independent learning style than their on campus counterparts. A research study by Jones and Martinez (2001) supports the findings of Diaz and Cartnal (1999) on the more independent nature of distance education students. Jones and Martinez compared the learning orientations of science students in distance education courses to on-campus students. According to Jones and Martinez (2001) learning orientations refer to the affective, conative and social factors of learning. The learning orientation questionnaire which was used in their study identifies four types of learners: the resistant learner who believes that learning will not help them to achieve personal goals; the conforming

learner who prefers highly structured learning environments; the performing learner who is self motivated in areas that they value but requires more guidance from a tutor in other areas and the transforming learner who is highly self motivated and independent. The results of Jones and Martinez (2001) study indicated that 93% of the students studying online were either performing or transforming learners. In the on-campus class only 68% of the students were either performing or transforming learners.

While learning style may be one factor that affects student success for both on campus and distance learners, other important characteristics for success in distance education include a high level of motivation, some independent learning experience, and a personal support network (Galusha, 1997). In a literature review about barriers to distance learning (Galusha, 1997) the author suggests that when computer conferencing and electronic mail are integrated into course delivery they can serve the dual purpose of enhancing interactivity and allowing for learner control of the pace of processing learning materials. While asynchronous CMC may offer learner control of the pace of learning and the degree of participation, interactivity among learners is dependant upon the comfort level of the learner with the medium; the greater their comfort level with CMC the more likely they are to participate in this form of communication.

In the following section I discuss how learning style research has guided this study, present an argument for the importance of understanding how individual learning style relates to learner success and briefly state the relevance of this study for distance education.

Statement of the Problem

The research on learning styles has explored learning style as it relates to personality, (Felder, Felder & Dietz, 2002) cognitive processing abilities (Kolb, 1984) and the differences in learning styles of on campus learners versus distance learners (Diaz & Cartnal,1999,

Moallem, 2003). There have been numerous studies on the impact of learning style in relation to student success for Distance Education students (Irani, Telg, Scherler & Harrington, 2003; Loo, 2004; Papp, 2001). Yet even with the considerable research previously conducted; the interaction of learning style, the methods of accommodation that individuals employ when learning at a distance and ways that instructors can facilitate positive learning outcomes in the distance learning environment is still not fully understood (Coffield, Moseley, Hall, & Ecclestone, 2004). The aim of this study was to contribute to the body of research in this area and to gain a greater understanding of these interrelationships.

While there continues to be much we don't understand, the outcomes of this study have contributed to an understanding of how distance education students and distance educators can use learning strategies and teaching methodology to meet the diverse learning styles in the distance education environment. If educators understand that there are various learning strategies that individuals employ dependant upon the learning situations they may be able to assist their students in determining the most effective learning strategies to adapt to the distance education courses they study.

Lui and Ginther (1999) explain the value of knowing the strengths and weakness of student learning styles. They claim that knowledge of the strengths of each of the four Kolb learning styles can be used to enhance the distance learning environment. For example, knowledge of the fact that the assimilator excels in "inductive reasoning, creating theoretical models, and assimilating different observations into an integrative entity" (p. 6) may assist both the student and the teacher in choosing learning activities that both incorporate and challenge their preferred ways of learning. In a more recent study by De Jong (2006) the author presents the results of a study with students in their third year of media studies. She used Kolb's learning cycle to inform her teaching by giving students an opportunity to reflect

on, discuss and relate their experience to the theory they were learning. De Jong (2006) concludes “The combination of offering media and documentary theory, practice-related theory and practical tuition is highly appreciated by students and has empowered their practice, which should always be considered desirable in teaching media practice in an academic context” (p. 157).

Research Context

This study employed a multiple case study methodology to explore the learning styles of Career Development Practitioner students who are studying at a distance. The Career Development Practitioner program is delivered primarily at a distance using WebCT, an online learning management system where it is possible for students to access their learning materials at their own time and place. There were also limited opportunities in this program to have synchronous online discussion forums. The program runs throughout the year but follows a semestered timeline, which means that students are expected to complete assignments within specified guidelines and timeframes. This program of studies uses online asynchronous computer based discussion forums as one tool to meet the learning outcomes of the program.

One of the advantages of the online, asynchronous, computer based program is that students can access learning materials from any personal computer at a time that is convenient for them (Valentine, 2002). Other advantages of the online, asynchronous computer based discussion are that students who need more time to formulate their thoughts are able to make contributions to group discussion in CMC (De Bruyn, 2004). This interaction of student to student and student to instructor is an important part of creating meaning in educational processing (Ehrlich, 2002, Moore, 1996, Muirhead, 2000).

Synchronous online discussion forums are another way of facilitating interaction and offer the advantage of immediate feedback and a closer feeling of an in person discussion (Box, 1999) since students are participating in discussion forums at pre-arranged times, again from any personal computer that is convenient for them. Synchronous discussion forums may be advantageous for some DE students as it gives them the opportunity to interact with each other and the learning materials at the same time. However, other students may prefer asynchronous computer conferencing because it allows them the time to think about the concept and formulate their response.

A study by Lin and Overbaugh (2007) was developed to determine if student preference for synchronous or asynchronous discussion forums is dependant on whether an individual has an introverted or extroverted personality. In their study both students in face to face classrooms and online instruction were required to participate in online discussions. They had the option of participating in threaded or asynchronous discussions or in real time chat. Students were given three research instruments. The first of these was a questionnaire to determine their level of introversion or extroversion, a Likert-type scale to measure their level of satisfaction with the course, and a cognitive achievement assessment. The results indicated that students are more likely to make decisions around whether to use asynchronous or synchronous discussion based on time factors without reflecting on how they learn.

The literature reviewed provides examples on how students utilize computer mediated conferencing to facilitate learning outcomes in the Distance Education environment which was one element of learning style explored in this investigation. An investigation involving the participants of a Career Development Practitioner program offered at a distance was the focus of my research. An important element of the work of a Career Development Practitioner is assisting clients with their career preparation by developing an understanding of how

personality type, learning style, skills and abilities affect choice of career (Penney & Cahill, 2002). In this study I focused on learning style and student success in distance education. For the purposes of this study I defined student success as the ability of the student to meet the learning outcome objectives of the program.

In this study I conducted telephone interviews with students enrolled in a Career Development Practitioner program offered through Distance Education at a community college with the aim of exploring the relationship between learning style (as measured by the Kolb LSI) and successful completion of a distance education course. Specifically; I explored whether certain types of distance learners perceive their learning style as a better match for successfully achieving the learning objectives. Kolb's experiential learning theory provided the theoretical framework for this study.

The results of this study provide recommendations for instructors to facilitate positive learning outcomes in the distance learning environment. More importantly, the significance of the findings were the insights gained about how learning style affects or does not affect the way that individuals process information in the distance education environment. These findings contribute to an understanding of how or whether distance education instructors should consider learning styles when facilitating DE activities. Using the results of the learning style inventory administered in this study I extend an understanding of the impacts of learning style in a distance education program as well as propose recommendations for facilitating positive learning outcomes which consider the diversity of learning styles among students studying through distance education.

Research Question

The research questions that this study addressed were:

- How is learner success influenced by learning style for Career Development Practitioner distance education students?
- What methods of accommodation do Career Development Practitioner distance education students with differing learning styles employ when studying by distance education?
- What are some of the ways that instructors can facilitate positive learning outcomes in the distance learning environment?

Delimitations

This study is bound by the following delimitations:

- The participants in this study were limited to adult learners. This study was not concerned with other populations (for example, primary or secondary school students were not included). As such the findings are not generalizable to other populations.
- This case study was limited to a small population of students and therefore it is not possible to generalize the results to all adult learners.
- The population for this study is limited to a specific college program (Career Practitioners Certificate). As such the findings can not be generalized to other educational programs.
- The participants were limited to students currently enrolled in the program. As a result I was not able to determine if students who enrolled in the program but left did so for reasons related to the mismatch of the learning methods to their learning style.

Definition of Terms

In this section I review and define the relevant terms of reference used throughout the study.

Career Development Practitioner

The role of the Career Development Practitioner is to counsel, inform, assist and teach individuals who are unemployed or underemployed. The nature of the work they perform may include delivery of workshops on career development and job search techniques, administration of questionnaire type instruments to assist individuals in identifying suitable careers, one to one counseling and information gathering related to the barriers faced by individual job seekers and finally they may facilitate employment opportunities through liaison with potential employers. Career Practitioners can work in a variety of settings including government agencies, colleges and universities; community and private employment based agencies

Cognitive Styles

This refers to the way an individual thinks and is an automatic way of responding to information and situations (Riding & Rayner, 1998).

Learning Styles

Learning styles can be described as the way that learners process learning materials. Keefe (1979) describes learning style as the “characteristic cognitive, affective and psychological behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment” (in Sabry & Baldwin, 2003, p.445). Learning style can also be described as the bridge between cognitive style and learning strategies leading to learning outcomes (Lord, 1998).

Learning style inventories

These are the various instruments used to measure learning style. Some are simple questionnaires developed by an academic institution to assist students in determining if distance education is suitable for them. Others are more sophisticated questionnaires that have been studied through academic research to demonstrate the validity and reliability of the particular inventory.

Learning Preference

Although this term is often used interchangeably with learning style, learning preferences indicates the conditions, under which students prefer to learn such as the physical environment preferences.

Learning Strategies

Can be defined as the response given by an individual to a particular learning context (Sadler-Smith & Smith, 2004)

Student success

Student success can be defined as the ability of the student to meet the learning outcome objectives of the program. Important issues related to student success in distance education include, but are not limited to learning style, level of preparedness of the student, motivation, study habits and familiarity with learning technology used in programme delivery.

Assumptions

In this section I discuss the major assumptions that have guided the development of this study.

Students studying in the Career Practitioner program at Conestoga College are primarily adult learners who have begun careers in the field of career counselling or other related work. It was assumed that they are studying to gain further knowledge of the practical

application of the experience and skills needed for their employment. As such I also assumed that they were more motivated to complete the requirements for a diploma than less experienced students who had entered college directly from high school. Another assumption of this study was that learning style inventories are useful tools for determining learner success in distance education.

A case study methodology was employed as it was assumed that gathering data from a small sample of participants will yield rich, descriptive information about the experiences of distance education students relevant to their learning style. My goal in this thesis was to develop a deeper understanding of how distance education students use their learning style and learning strategies to meet the learning objectives of their course. According to Neuman (2003) “Case study uses the logic of analytic instead of enumerative induction...the researcher carefully selects one or a few cases to illustrate an issue and analytically study it (or them) in detail” (p. 33). The case study was an appropriate methodology for my thesis because the results allowed me to analyze how or if the participants learning outcomes were affected by their learning style.

Significance of this study to Distance Education

The results of this study make a contribution to the understanding of how distance education students utilize different learning styles to successfully complete educational courses at a distance. Educators will be able to use the results of this study to assist their students in determining the most effective learning strategies for completion of the courses they study. This study also adds to the body of knowledge on how individual learning style relates to learning objective achievement in distance education. Prior research has suggested that it is possible that individual learning style may have a profound effect on the ability to meet the

course outcomes. Based on my own experience as a distance learner, I believe that this may be due to the possibility that certain learning styles are more adaptable to the independent nature of distance education. As such, I was inspired to explore learning styles as they apply to the material learned. By adapting to the distance learning environment accordingly, I believed that the student and the instructor may be more likely to have successful outcomes. Some research studies have supported this belief. For example, a study of the learning styles of online MBA students (Barnes, Preziosi & Gooden, 2004) suggest that 45% of students studying online prefer a Reflective Observation style of learning and 30% of the students used the Abstract Conceptualization mode. Since individuals employ different learning modes for processing and transforming information this indicates that the learning strategies employed by individuals with Diverger (individuals combining concrete experience and reflective observation) and the Assimilator style (individuals who combine Reflective observation and abstract conceptualization) may be more effective in processing information within DE environments than students with an Accomodator (individuals who combine Concrete experience and active experimentation) or Converger (individuals who combine abstract conceptualization and active experimentation) learning style.

Barnes, et. al. (2004) suggest that if further research supports their findings this is perhaps due to the possibility that online students self select for this type of learning because of their learning style. This does not necessarily suggest that one type of learning style is more suitable or predisposed to success in Distance Education. Other factors such as previous experience with distance education courses or programs, media style employed, aptitude, study habits and persistence are other factors which may contribute to learner success (Galusha, 1997).

In chapter two, I review the literature pertaining to learning styles beginning with the theoretical foundations of learning style. I then look at a few major learning styles theories before providing a discussion of Kolb's (1984) experiential learning theory. Kolb's theory is discussed in relation to personality theory paying particular attention to the Myers-Briggs Type Inventory (MBTI) followed by a summary of the current state of knowledge on learning styles. I conclude the chapter with a brief explanation of why the Kolb LSI was chosen for this research study.

CHAPTER 2: REVIEW OF LITERATURE

Theoretical Foundations

According to Lui and Ginther (1999) learning style is referred to as “the individual’s consistent and characteristic predispositions of perceiving, remembering, organizing, processing, thinking and problem solving” (pg. 2). Cafferella and Barnett (1994) describe learning style as a person’s preferred way of processing information within specific learning situations. They explain that learning style can be described as the senses through which an individual filters the learning material. For example some people prefer to learn by listening or watching, others by doing. Much of the literature on learning styles separates the concepts of learning styles from learning strategies. The difference lies in the fact that a learning strategy involves the manner in which students adapt their learning style to suit the needs of the learning environment. The relationship between cognition, learning style and learning strategies is succinctly described by Sadler-Smith and Smith (2004). They suggest that the habitual information processing modes are the cognitive styles of the individual learner. That is to say that cognitive style is related to the way an individual thinks about the information they are learning. The way that an individual processes that information or behaves in relation

to it is the learning style. Finally, learning preference relates to the preferred learning mode, for example a preference for reading, writing, lectures and discussion.

In effect they are suggesting that an individual's learning style is determined by the way she/he approaches learning and the channel through which she/he process learning materials.

Curry's review of Learning Style Inventories

Many inventories have been developed to measure learning style and in this section I will introduce some of Curry's (1983) thoughts on a selection of these learning style inventories. A review of some of the various instruments used to measure learning styles was conducted by Curry (1983). In her seminal work she likened the various types of learning style theories as corresponding to the layers of an onion. According to Curry, the innermost layer of the onion is learning styles theory based on personality theory (such as the Myers-Briggs Type Inventory). She labeled this as the cognitive personality style and considered it the most stable. She defines cognitive personality theory as an individual's approach to adapting and assimilating information that becomes evident indirectly when observing individual behaviour across many learning instances. Curry describes the second layer of the learning style onion as the Information processing style. She describes this as the intellectual approach to integrating information and states that it is relatively stable although it can be modified by utilizing various learning strategies. An example of one of the theorists employing this model would be Kolb (1984).

Curry originally proposed three layers of the theoretical onion model of learning. The outermost layer of Curry's theoretical onion is the most observable and she entitles this instructional preference. This refers to choice of environment in which an individual learns. At

this level the individual interacts directly with the environment, teacher expectations and other external features and therefore this is the least stable to learning styles theories. Reichmann and Grasha (1974) student learning styles would be a learning style inventory in this category. At a later date Curry introduced a fourth layer to her onion model; social interaction. Social interaction relates to the individuals preference for social interaction during learning. An example of a learning style inventory measuring type and level of interaction is Reichmann and Grasha (1974).

The interesting aspect of Curry's Onion model of learning as it relates to DE is that effective learning can take place when all of the different aspects of the learning experience are brought together to form the various layers effecting learning outcomes. This line of thinking relates to the experiential learning framework outlined by Kolb (1984) in that Kolb also believes that learning occurs when we develop less preferred aspects of the learning cycle. I will expand on the experiential learning cycle in the following section.

Experiential Learning as a Framework

Kolb (1984) draws on the theories of Dewey, Lewin, Vygotsky and Piaget in the development of his theory on experiential learning which is the basis of his learning style inventory. Some examples of the extent that experiential learning has shaped education are internships, field placements, work/study assignments, role play, and gaming simulations.

Experiential learning theory offers the foundation for an approach to education and learning as a lifelong process that is soundly based in intellectual traditions of social psychology, philosophy and cognitive psychology (Kolb, 1984, p. 3).

Kolb argues that experiential learning has arisen out of the need for adult learners to have an opportunity to apply what they learn in the classroom in a practical manner. This is

part of the reason why the experiential learning framework is such a good fit for a program such as the Career Practitioner program studied in this research. According to Kolb, learning methods that combine work and study, theory and practice provide a more familiar and therefore more productive way to learn. According to Carafella and Barnett (1994) adults who have not had a good experience with education in early years who return to school as adults may see themselves as poor learners in formal settings, even when they have been successful in non-formal learning situations like their job, managing a home or volunteer work. Schön (1983) contributes to experiential learning theory through a discussion of the concepts of “knowing in action” vs. “reflection in action”. He argues that “knowing in action” relates to the way people carry out actions without needing to think about the processes involved while they are engaged in the activity. They know how to do something but may not be able to describe the process because the particular activity has become routine for the person (such as driving a car). Reflection in action involves thinking about how to perform an activity in a way that reshapes the way of performing it while engaged in the activity. Finally a central concept of experiential learning is situated learning. According to Carafella and Barnett (1994) “learning activities need to be “situated” as closely as possible to practice they represent in order for learning transfer to become a reality” (pg.36). Examples of learning activities in which situated learning is an important part of learning activities are apprenticeships, internships and work placements.

The Lewin, Dewey and Piagetian learning models were the basis for Kolb’s model of experiential learning. The parallels are obvious in the Lewinian Experiential Learning Model (as illustrated in figure 1). Kolb (1984) also describes the theory in this way:

Immediate concrete experience is the basis for observation and reflection. These observations are assimilated into a theory from which new implications for action can

be deduced. These implications or hypotheses then serve as guides in acting to create new experiences. (p. 21)

The diagram that follows is a visual representation of Lewin's model of experiential learning as conceptualized by Kolb (1984).

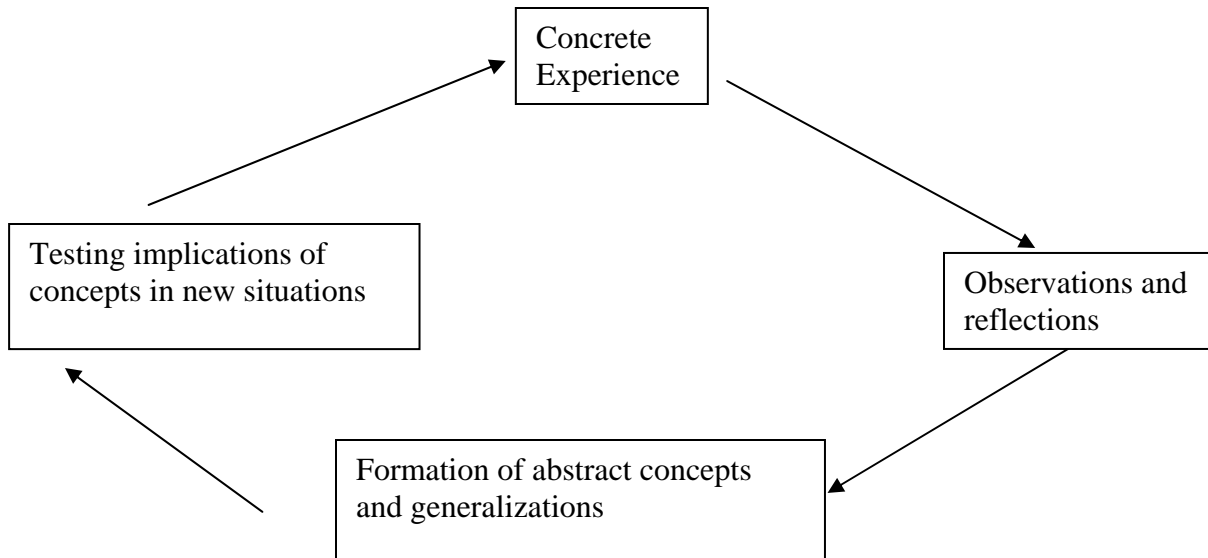


Figure 1. the Lewinian Experiential Model (Kolb, 1984)

Dewey's model of experiential learning is similar to Lewin's. According to Kolb (1984):

The impulse of experience gives ideas their moving force and ideas give direction to impulse. Postponement of immediate action is essential for observation and judgment to intervene, and action is essential for the achievement of purpose. (p. 22)

In order for learning to occur an individual makes observations about a phenomenon and that observation leads to knowledge which guides purpose and action on that knowledge.

Piaget's model of learning follows the development of the child through to adolescence. His model is used to shape the theory of experiential learning by explaining the cognitive processes involved in moving from a concrete phenomenal view of the world to an abstract constructionist view, from active egocentric view to a reflective internalized mode of knowing (Kolb, 1984). This cycle of child learning development has parallels with Kolb's experiential learning cycle. For example, as Piaget's young child develops a repertoire of experience through direct manipulation of concrete phenomena (by grasping a toy for instance), so too does the adult who is at the concrete experience stage of the learning cycle transitions and learns new concepts by directly applying concepts learned to real life experiences.

Kolb outlines six components of learning. First learning is best described as a process, not in terms of outcomes. Essentially, he suggests that ideas are derived from and modified by experience. Individuals approach new learning opportunities with the frame of reference of their prior experience and transform their conceptualization of the reality given the new information or experience. This leads to Kolb's second component of the learning process; that learning is a continuing process grounded in experience. Individuals are continuously building on their knowledge by testing new information against their previous experiences. Kolb (1984) suggests that "If the education process begins by bringing out the learner's beliefs and theories, examining and testing them, and then integrating the new, more refined ideas into the person's belief systems, the learning process will be facilitated" (p. 28).

The third point that Kolb makes about the nature of learning is that learning requires the resolution of conflicts between opposing modes of adaptation to the world. He suggests that learning is a tension and conflict process and that we use different types of abilities to resolve these conflicts. He suggests that when individuals are actively engaged in a new

experience they are using their concrete experience abilities. When individuals reflect on this new knowledge they are using their reflective observation skills. Individuals who create concepts that integrate their observations about phenomena into logically sound theories are using their abstract conceptualization abilities. Finally, in order to use theories to make decisions and solve problems, individuals need to use their ability to actively experiment with the knowledge gained. Individuals use all of these modes of learning to various degrees but generally employ a particular style based on the demands of the information to be learned and their trusted learning style. That is to say that an individual has a preferred way of processing information which they will use first to resolve a problem, but may draw on other abilities if the situation merits they explore their other abilities.

Kolb draws on personality type theory when he discusses the fact that learning is a holistic process of adaptation. According to Kolb “the Jungian theory of types, like the experiential learning model, is based on a dialectic model of adaptation to the world” (Kolb, 1984, p.144). He argues that learning “involves the integrated functioning of the total organism—thinking, feeling, perceiving and behaving” (Kolb, 1984, p. 31). When viewed within the framework of other theories, we see that experiential learning involves the integration of the individual with the environment to the extent that the individual transforms their environment through interaction with it. At this point the individual transforms their personal knowledge with the social knowledge of their learning environment. From this Kolb presents a working definition of learning. According to Kolb (1984) “Learning is the process whereby knowledge is created through the transformation of experience” (p. 38).

Kolb discusses the two dimensions of experience as the grasping of information and the transformation of that knowledge. If a learner uses their concrete experience abilities to understand information then it is labeled as apprehension by Kolb. If a learner uses their

abstract conceptualization abilities, then they are using their comprehension function according to Kolb. In developing a theory to help understand the transformation dimension of learning Kolb draws on the work of Carl Jung related to the concepts of introversion and extroversion. According to Jung (1923) individuals actively engage with their environment and transform that activity through internal reflection on the phenomena. In developing his experiential learning theory Kolb interprets Jung's theory when he writes: "Learning, the creation of knowledge and meaning, occurs through the active extension and grounding of ideas and experiences in the external world and through internal reflection about the attributes of these experiences and ideas" (Kolb, 1984, p. 52).

Individual learning style is suggested by the ways and the degree to which individuals have typically reacted to a similar experience in the past. According to Kolb "this self programming, conditioned by experience determines the extent to which the person emphasizes the four modes of the learning process: concrete experience, reflective observation, abstract conceptualization, and active experimentation" (Kolb, 1984, p. 64).

In describing the similarities between Jung's type theory and the Kolb LSI, Kolb cites a study which demonstrates the correlation between personality type and learning style (Margerison & Lewis, 1979). However there are problems with this study which make generalizations about the relative similarities of the two measures difficult to substantiate. For example in the above cited study, the authors compared MBTI scores to LSI scores to demonstrate that there are similarities between the two measures. While there are some significant correlations, the fact that there is a lot of missing data makes it difficult to make some definitive conclusions about these correlations.

Kolb does however offer some compelling information about the relationship between choice of career and learning style and demonstrates that certain professional groups are likely

to demonstrate a specific learning style. For example, according to a study by Christensen, Lee and Bugg (1979) 70% of Nurses are divergers or accommodators.

In a discussion on apprehension vs. comprehension Kolb suggests that apprehension is how we initially understand something and through synthesizing multiple theories about what is known, we develop a more social comprehension. In effect we are building new knowledge by incorporating what we know from direct experience, with ideas that other individuals have built upon, thus creating a continuous cycle of constructing and reconstructing our knowledge basis.

In a brief description of the dimensions of accommodation vs. assimilation Atherton (2005) describes the differences as: “In Assimilation, what is perceived in the outside world is incorporated into the internal world, without changing the structure of that internal world” (p. 4). In comparison accommodation occurs when “the internal world has to accommodate itself to the evidence with which it is confronted and thus adapt to it” (Atherton, 2005, p 4).

Kolb introduces the idea of the experiential learning theory of development and draws on the writings of Freire (1974) and Vygotsky (1978) to support his theory. Kolb writes that “Through experiences of imitation and communication with others and interaction with the physical environment, internal developmental potentialities are enacted until they are internalized as an independent development achievement” (Kolb, 1984, p.133). This is similar to Vygotsky’s theory of the zone of proximal development in that he suggested that learning and development are a continuous process based on the interaction of the individual with the environment and with a more advanced individual (teacher, tutor or peer with more experience in the particular learning task) (Vygotsky, 1978).

Other authors have discussed the value of experiential learning. In an article analyzing the current state of social work practice Fink (2007) notes that students become more engaged

in and interested in their education when they are given the opportunity to apply and integrate what they have learned. Fink outlines six stages of what can be described as ‘significant learning’ and argues that when teachers use this integrated approach the learning experience becomes more significant because “the students become co creators of their own learning, the intended learning has greater meaning, and students are given a wider range of tools to create this learning—often including the opportunity to work closely with other students on promoting each other’s learning” (p.17).

In a summary of the future directions needed in experiential learning research Bialecheski (2006) notes that:

Research is one tool we can use to tell our story in a way that highlights our *relevance* as we work to build positive *relationships* and offer opportunities for *real* self-discovery through experiential education. We need to build our research repertoire with longitudinal studies, more mixed methods, demographic analyses that reflect our changing society, studies to address technology issues, and projects that help articulate values important to our programs (p.368).

In the next section I review the dimensions of Kolb’s Learning Style Inventory and discuss the implications in the distance education learning environment.

Kolb’s Learning Style Inventory

Rasmussen and Davidson-Shivers (1998) suggest that Kolb’s learning style theory is based on the idea that learning is comprised of two dimensions: how information is processed and how it is perceived during the learning experience. According to Kolb (1984) individuals learn in four stages or modes: concrete experience, reflective observation, abstract

conceptualization, and active experimentation. At the concrete experience stage of the learning cycle, the emphasis is on personal involvement with people such that “In a learning situation, you would rely on your ability to be open-minded and adaptable to change” (Kolb, 1985, p. 5). During the Reflective Observation stage individuals understand ideas and situations from different points of view. In a learning situation an individual would carefully judge the learning situation, reflecting on what they read but not necessarily take any action. In Computer Mediated conferencing these types of learners may be referred to as “lurkers”. Despite the negative connotation of this term, studies have shown that “lurkers” may be using the time that they read online postings to assimilate new ideas with their previous conceptions. According to a study by Lobry -De bruyn (2004), these individuals may be reticent at posting because they missed the opportunity (the thread of the online conference has changed) or they may be afraid of repeating something that has already been said.

The next phase in the experiential learning cycle is Abstract Conceptualization. At this stage individuals rely on logic and planning to solve problems. In the Active Experimentation stage, individuals experiment with different ideas and value tangible accomplishments. Kolb argues that individuals use different combinations of these four stages dependant upon the learning situation and that these combinations of strategies form an individuals learning style. The four learning styles as described by Kolb (1985) are Accommodator, Diverger, Converger and Assimilator. Individuals whose learning style is a combination of Concrete Experience and Active Experimentation are seen as Accomodators. They learn best by hands on experience. People who combine Abstract Conceptualization and Active Experimentation have a Converger learning style. They like to find practical uses for ideas and theories. Kolb describes individuals who prefer to combine the learning stages of Concrete Experience and Reflective Observation as Divergers. Their approach to situations is to observe rather than take action and

they may excel at activities such as brainstorming or generating many ideas. Finally, Kolb describes individuals whose learning style is a combination of Abstract Conceptualization and Reflective Observation as Assimilators. Students who have this learning style are able to understand a wide range of information and put it into concise logical form.

In the technical manual of a recent version of the LSI Kolb (2005) indicates that the purpose of the LSI is to assist students in developing an understanding of how they learn. They can then use this information in dialogue with their peers and their instructor to discuss the most effective environment in which to foster their learning.

The implication for educators is that an instructor may want to use a diversity of learning activities in order to accommodate these different styles of learning. Kolb sees learning as a cycle and believes that all students can adapt their learning styles according to the demands of the learning activity.

Critique of the Kolb LSI

Despite the fact that there has been some negative critique of the Kolb LSI, I have chosen to use it in this study to measure student learning style because of its connection with the experiential learning cycle as developed by the incorporation of the ideas of several theorists including Dewey, Lewin, and Kolb.

There have been many articles critiquing the use of the Kolb LSI due to lack of reliability and validity (see for example Freedman & Stumpf, 1980, Geiger, Boyle & Pinto, 1992, Newstead, 1992). The following discussion addresses some of the concerns held by several researchers.

One of the authors who conducted a study using the Kolb LSI and published a critique of the instrument was Kreber (1998). One of the problems identified by Kreber is that Kolb

has based his support of the cycle of learning on the MBTI which is a misinterpretation of Jung's theory of personality type. "Jung distinguished between two basic attitudes, introversion and extraversion and four different psychological functions, thinking, feeling, sensing and intuition" (Kreber, 1998 p. 5). The author argues that the use of the results of correlational studies using the MBTI is misleading because they measure attitude independent of function. However, according to Briggs-Myers, McCaulley, Quenk, and Hammer, (1998) they indicate that the MBTI instrument is an interaction of the functions and the attitudes and demonstrate that each element is interconnected. They argue that "The richness, depth, and breadth of their descriptive systems result from the dynamic interplay of the functions and attitudes inherent in each type" (Briggs-Myers, et al, 1998, p.23). As well, the MBTI instruments (and Jung's typology from which it was developed) were conceptualized to measure an individual's orientation to the world, not as a measure of how individuals learn. Kolb used this information along with other educational theories such as Lewin, Dewey, and Piaget to build his experiential learning framework which is a useful tool for understanding how individuals learn.

Lawson and Johnson (2002) share the results of research with college students who completed two tests to determine the interaction between thinking/feeling and instructional method. One of the first flaws of this study is that they only examined one dimension of the Kolb instrument (reflection) but neglected to examine the observation/doing dimension. Another assumption made by the authors is that learning style theory and the developmental theory of Piaget are mutually exclusive; which they are not, at least when reviewing Kolb's theory. While it is true that "learning style theorists argue that instruction should take into account students' learning styles" (Lawson & Johnson, p. 81), Kolb (1984) in particular argues that the learning experience is a cycle and it is the role of the educator to assist the student in

progressing through the learning cycle by developing skills in their less preferred learning style.

An extensive research article on Kolb's LSI was conducted by Ruble and Stout (1994). In this article the authors critically analyzes the Kolb LSI on three dimensions: construct validity, measurement problems, and reliability (including internal consistency and temporal stability). The first half of this article deals with the problems in the 1976 version of the Kolb LSI. The LSI was updated in 1985 and again in 1993 (no mention of the 1993 revisions are included in this article). The author maintains that "the revised version represents an improvement in some areas; in other areas it accentuates problems with the original instrument" (Ruble & Stout, 1994, p. 5). One of his criticisms is due to the fact that there is a potential for spurious negative correlations due to the ipsative nature of the LSI. The author also discusses the fact that the questions are presented in a single column format (that is AE in one column, CE in another, RO in the third and AC in the fourth). They argue that this may result in respondents demonstrating a bias to one type of activity; that is that they may rank the items in one column the same way due to the proximity of the statements. He sites studies where the questions were scrambled to demonstrate the validity of this claim. While these are valid claims, there have been several revisions since that time which have addressed some of the issues that Ruble and Stout raises. However, given the timing of when the article was written, there would not likely have been research studies that had used the (then) newly revised Kolb LSI.

Using three different measures (including the Kolb LSI) Aragon, Johnson and Shaik (2002) compared online students to in class students to determine if there were differences in learning style and student success. They found that there were significant differences in the two groups for the Kolb instrument but attribute these differences to the nature of the study

mode. They further argued that when student success was controlled for, the difference was not significant.

Lord (1998) discusses Kolb in the context of the experiential learning cycle. The aim of this research paper is to “probe the relationships between learning styles, types of learning activity, and learning outcomes” (Lord, 1998 p.1). The essence of the experiential learning cycle is discussed in this article along with learning activities that learner’s in each of the various categories should excel at. For example he suggests that individuals who prefer Reflective Observation excel at activities requiring considered judgment and assessment. Lord argues that since the various categories of learning are linked to the experiential learning cycle model, the Kolb LSI can provide a good indicator of the relationship between learning task and learner performance. Lord describes the individual learner’s learning style as the bridge between cognitive processing and the learning strategies and other factors that contribute to learning outcomes as is illustrated in Figure 2 below:

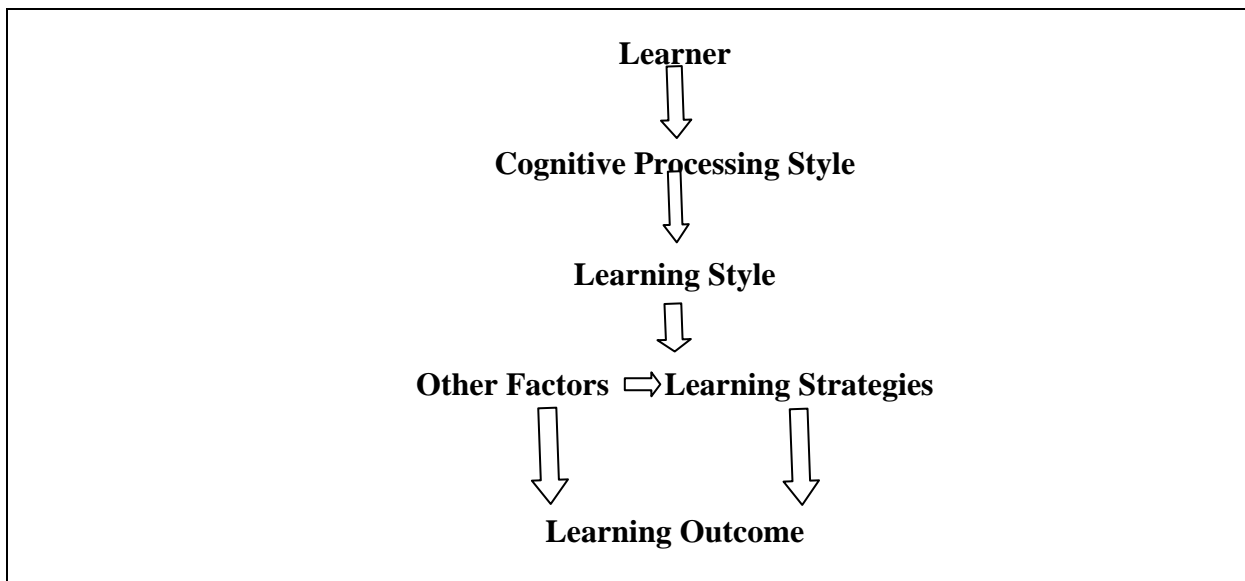


Figure 2. Learner characteristics and other factors affecting learning (Lord, 1998)

Learners approach learning in an individual specific manner (their cognitive processing style), they employ various learning strategies, which ultimately lead to a particular learning outcome. Other factors that may affect a positive outcome of their learning activity is their level of motivation, personal circumstances and support network, to name a few.

Although there are numerous research studies that both support and criticize the use of the Kolb LSI, the evidence is inconclusive with regards to the merit of matching learning style and instruction according to a study by Coffield, Moseley, Hall and Ecclestone (2004). In a section of their review of learning styles models the authors reference numerous research studies that have been conducted using the Kolb LSI and conclude that “ There does not appear to be sufficient experimental evidence about Kolb’s learning styles on which to base firm recommendations about pedagogy” (Coffield, Moseley, Hall & Ecclestone, 2004 p. 71). This suggests that they neither recommend nor denounce the Kolb LSI as a tool to measure learning style. Finally, more recent research (Dyke, 2006) suggests that the Kolb experiential learning cycle might be a useful model of learning if it was improved “by having the arrows flow in both directions. The Kolb pathway is seen as a logical and effective way of learning, but not the only possible route to reflective learning. A student once suggested that the Kolb/Lewin model should be viewed as a sparking chamber in which the learner makes contact with each point, but not in any specified mechanical order. This sparking chamber of learning is, in essence, non-linear” (p. 121).

Learning Styles and the Myers-Briggs Type Indicator

Like learning style theory, personality theory such as the Myers-Briggs Type Indicator also highlights psychological characteristics of individual students. In this section a brief overview of the MBTI is presented. In the next section I will present some similarities between

the MBTI and Kolb's LSI. Personality theory using the Myers-Briggs Type Indicator (MBTI) is based on four dichotomous psychological preferences: extraversion/introversion, sensing/intuition, thinking/feeling and judgment/ perception (Irani, Telg, Scherler, & Harrington, 2003) A brief explanation of the introversion/extroversion dichotomy based on a summary of several research studies using the MBTI with students in a variety of learning environments, indicates that the that extroverts prefer learning activities that "involve active experimentation or concrete experience and sometimes both" (Briggs-Myers et al, 1998, p. 261). Conversely, Introverts tend to "do their best thinking in anticipation rather than on the spot" (p. 261).

With regard to the differences between students who prefer sensing or intuition; sensing types approach learning through fact retention, methodical study, and serialist or sequential learning. Intuitive learners on the other hand approach learning in a more global or holistic fashion and focus on abstract concepts in learning. It is easiest for them to adapt to self-directed learning situations as they are using their preferred learning style. The differences on the remaining two dichotomies are less clearly outlined in the literature. Thinking types are similar to sensing types in their appreciation of fact based, methodical reasoning. Additionally they are highly goal oriented.

Feeling types on the other hand have a more abstract random learning style, like to learn in a connected environment and are adaptive in creativity.

The final dichotomy of Judging/Perceiving differs in the way individuals approach learning tasks. Judging type individuals prefer drill and practice, like independent study, and are very goal oriented. Perceiving types like experimental approaches to their learning and enjoy learning activities that are more random and involve collaboration.

Similarities between Kolb LSI and the MBTI

One of the most commonly used tools for determining personality type is the Myers-Briggs Type Indicator (MBTI). While the MBTI will not be a part of this study it is interesting to note the similarities between the MBTI and the Kolb LSI. The impact of personality has been studied as it relates to educational outcomes by Felder and Silverman (1988) Felder, Felder and Dietz, (2002) Soles and Moller (2001). This information is useful as it relates to learning style and learner success in that personality and learning style are often linked. This is especially true with the Kolb Learning style inventory which shares similarities with the MBTI; an instrument developed using Jung's theory of personality.

When comparing the Kolb learning inventory to the MBTI it is evident that there are similarities. Kolb (1984) describes learning as the "integrated functioning of the total organism; thinking, feeling, perceiving and behaving" (p.31). This borrows from Jung's concepts of personality type theory which forms the basis of the MBTI. According to Trevino, Lengel, Bodensteiner, Gerloff, and Muir (1990), Kolb's Concrete Experimentation (CE) and Abstract Conceptualization (AC) are similar to the perceptive vs. judging dimension measured by Myers Briggs Type Indicator (MBTI). The perceptive persons are expected to prefer rich media, such as the integrative use of pictures, tables, and diagrams, while the judging persons are expected to prefer lean media, such as without the integrative use of pictures, tables, and diagrams. This may have wide implications in distance education. For example Moallem (2003) suggested that:

when designing instruction for a universal audience and for an environment that can easily be dominated by text based communication and heavy reliance on independent learning skills, (e.g. in online or web-based courses) the teacher's challenge is to produce a course or instructional material that does

not have an obvious tilt to one learning or thinking style and is diversified enough to meet multiple learning styles (p. 209).

In other words, it is important that the instructor in the DE learning environment diversify their teaching methods so that students of many types of learning styles can participate in a learning environment that suits their preferred way of processing information. The advantages of this diversification of teaching method and allowing students to choose from a variety of learning evaluation exercises is that the student becomes more engaged in their learning and is able to choose from a variety of learning tasks to suit their preferred way of learning. Alternatively, when students rely on using learning tasks where they are employing only their preferred way of learning, they may not develop problem solving skills in their least preferred learning style. They become less flexible when confronted with learning activities that require them to use skills other than their preferred learning style.

Summary of Learning Style Inventories

Several other learning style inventories have been developed to measure the way that individuals learn. A brief description of some of the major learning style inventories follows.

Reichmann and Grasha's (1974) Style of Learning Interaction model is described as a social interaction scale (Cassidy, 2004). The focus is on social and affective dimensions of style and ranks students on the three continuums of avoidant-participant; competitive-collaborative; and dependant-independent. The student who has a high score on the avoidant end of the avoidant-participant scale is characterized by a lack of enthusiasm about course content or participation in course related activities. The opposite is true of the individual who scores high on the participant end of the scale.

The difference between the competitive and the collaborative learning dimension is that Competitive students are motivated by performance outcomes; it is important for them to see that they are doing better than other students. Collaborative learners on the other hand learn by group projects and cooperation with other students. The final dimension of dependant-independent involves the way in which students prefer to organize their learning experience. Independent students prefer self-pace instruction, studying on their own, and choice in assignments. Dependent students prefer clear guidelines and teacher guidance (Kumar, Kumar, & Smart, 2004). This inventory is a learning preference scale as the authors believe that learning preference may be altered according to the learning situation.

Another example of a learning style inventory is Felder and Solomon's (1996) Index of Learning Styles. It focuses on 4 bipolar dimensions of learning: Active-Reflective, Sensing-Intuitive, Visual-Verbal and Sequential-Global (Papp, 2001). The active learner tries different alternatives and works well on group activities, whereas a reflective learner would prefer to take time to think ideas through and problem solve on their own. The visual learner performs best when they have pictures, graphs or charts and a verbal learner needs written or spoken instruction. The learner who attains a high score on the Sensing dichotomy prefers facts and procedures whereas the intuitive learner is more conceptually oriented and focuses on theory. The final measure of the Index of Learning Styles measures how an individual processes information. The sequential learner focuses on small amounts of information in the order that it is presented, whereas a global learner would learn in larger segments.

Research studies using Learning Styles Inventories

There are a wide range of peer reviewed articles representing research on learning styles and articles summarizing conference proceedings. Shia, Ingebritsen, Pleasants, Flickinger & Brown (1998) examine the effects of learning strategies and learning styles with

a greater focus on the strategies employed by learners effecting their learning outcomes. They conclude that learning strategies have no significant effect on learning outcomes. Perhaps this is because they were reviewing learning strategies as opposed to learning style employed by the student. According to Curry (1983) this would be the least stable of all learning styles theories as it represents the outer layer of her theoretical onion model. As well, this finding is contrary to the findings of other theorists on learning styles. While Felder and Silverman (1988) were not studying the learning styles of students in a distance education environment, they concluded that it is important to understand that the diversity of ways in which student's process materials needs to be addressed in the teaching style of the educator.

Learning Styles and Distance Education

Learning styles of students in a distance education course were compared to their counterparts in a classroom based course by Gee (1990). She also concluded that learning style has an impact on learning outcomes and that students learning at a distance may need additional supports to achieve success.

A more recent study (Sabry & Baldwin, 2003) reviewed three dimensions of learner interaction with learning materials. These are: learner/information, learner/tutor, and learner/learner. They also introduce the concept of two major learning styles; Sequential and Global learning styles and cite the writings of Felder and Silverman (1999) to offer an explanation of the differences in these two dichotomies of learning. They define sequential learners as "progressing towards learning using logical and small incremental steps. Global learners progress towards learning in non-linear ways; holistically" (p. 446). They conclude that most students use sequential learning strategies to process materials but offer suggestions on how to accommodate both of these aspects of student's learning styles. The limitation of

this study is that they only focused on these two aspects of Felder and Silverman's learning style inventory.

An important issue related to learning style and distance education is the issue of whether collaborative learning is a useful learning tool for learners who prefer a more solitary or reflective learning style. In a recent study by Ke and Carr-Chelmen (2006) students were observed and interviewed to determine whether they preferred interactive or solitary learning activities. Their findings indicated that "The participants, who prefer solitary learning activities, prioritized independent reading and reflecting. In other words, they interacted more internally with content than externally with fellow students or instructor" (p. 255).

Not all learning style assessments are useful at determining success in distance education. Papp (2001) reviews the various learning style assessment tools available and suggests that Felder and Solomon's Index of Learning styles (1996) seem to have more consistent and predictive value than other scales. However, Papp cautions that larger population samples need to be studied if learning styles inventories are to be a useful tool in predicting successful outcomes for students. It should also be noted that Solomon and Felder were only studying Engineering students, so the results may not be transferable to students studying in other disciplines. There have been several criticisms of Kolb's LSI with regard to reliability and validity (Freedman & Stumpf, 1981, Geiger, Boyle & Pinto, 1992, Newstead, 1992). In a review of a number of learning style inventories, Suskie (2002) suggests that the instrument is similar to the MBTI which has been validated in numerous studies. Curry (1987) also reported strong reliability. Other strengths of Kolb's learning style inventory are that it suggests that individual's use a variety of learning styles throughout the learning cycle in the theory of Experiential Learning as outlined by Kolb (1984). This suggests that individuals can

accommodate their preferred learning style to the teaching strategies employed by the instructor, providing there are varied teaching methods employed.

A study to determine how learning style can be adapted for the online environment was conducted by Moallem (2003). In her research she offers different learning tasks to accommodate a variety of learning styles. She hypothesizes that certain students will be attracted to learning activities that suit their particular learning styles. The results of her study concur with this theory but it is also noteworthy to recognize that students welcome the challenge to their preferred way of learning by engaging in learning activities that use their non-preferred method of learning.

The State of Knowledge on Learning Styles

Learning styles have been studied extensively as they relate to performance outcomes in traditional classroom settings (Gee, 1990). However, there is not an overabundance of research in the area of learning styles and distance education (Diaz & Cartnal, 1999)

In a more recent study of the various instruments used to measure learning styles, Cassidy (2004) indicates that there are many learning style inventories that share similarities in both style and measurement. He argues that a rationalization and further study is needed to determine which of the various instruments would be best for measuring the contribution of learning style to learner success. He also suggests that it is important to match the learning style inventory with the level of learning (i.e. primary, secondary, post-secondary, vocational). When conducting research on learning style, it is also important to determine what aspect of learning style is being measured and match the learning styles inventory to that aspect of learning style. An example of this might be to look at the ways that individual's process information and which type of learning environment an individual prefers to work in. Another ways of measuring learning outcomes is to study whether an individual needs to approach

learning sequentially or globally (as measured by the Solomon & Felder LSI, 1996). A type of learning style inventory that may be particularly useful to distance education is one that measures the level of social interaction. If a student studying in a distance education understands this concept and how it relates to his or her particular style; then they may be able to develop learning strategies that compensate for the lack of social interaction in some distance learning environments. Reichmann and Grasha (1974) were measuring this when they developed the Student Learning Styles Scale to study the need for social interaction among learners.

Some of the learning style inventories have produced better reliability and validity over time than others and therefore caution should be exercised in using any learning style inventory as the only tool for understanding how students learn. For example, Felder and Solomon's LSI (1996) measures learning according to where a student falls on the continuum of four different dimensions: sensing/intuitive, visual/verbal, active/reflective, and sequential/global. This learning inventory uses the dual theory of personality and cognitive information processing. Learning is a complex process that involves many other dimensions such as student motivation, personal commitment to learning, intelligence, and ability. Although some learning style theorists such as Kolb would argue that learning style is relatively stable others like Reichmann and Grasha (1974) will argue that learning outcomes can be enhanced by a combination of environmental factors and the usage of other learning tools. The diversity of learning style inventories and the theory surrounding them serves to illustrate that any learning style inventory will be a small part of the equation used to measure student success.

In a research article by Smith (2006) the author indicates that teachers rely on their experience to assess the learning styles of their students and "the experience base of these

teachers has given them confidence that such differences and commonalities can be a useful tool in teaching. It was evident in a number of the case studies that the teacher had adopted an understanding of learning styles that was similar to an established theory of style or preference, but the teacher was not aware of the existence of that theory” (p.265).

Personality Theory and Learning Style

Personality theory such as the MBTI has also been used extensively to determine how a student's self ascribed personality type impacts on their achievement in an academic setting. Personality type theory has been developed for educational purposes to offer suggestions on how to accommodate for the various personality types in a learning environment. Personality theory as it relates to learning style should be used with caution as well. This is due to the fact that there have been mixed reviews as to how successfully personality theory can determine how an individual processes learning material. As well, it is important to remember that an instrument such as the MBTI was originally developed to study personality differences, not learning style.

Summary

Learning styles inventories like the Kolb LSI could be used as one tool to help gain a better understanding of how individual personality interacts with learning style to process learning materials. Other tools would include varying instructional methods, addressing the interaction needs of learners with learning materials, the instructor and other students (Moore, 1989).

Learning styles theory has added another perspective to the concept of student success. It has been noted elsewhere in this paper that an individual's preferred learning style is only one aspect to be considered when measuring student success. An individual's preferred learning style may remain stable over time but other factors may affect the ability of a student

to successfully complete a course or program of study in the traditional classroom as well as in the distance education environment. Knowledge of the various learning styles theory can assist educators and their students in understanding which approaches to learning are useful for which students and under which circumstances but they cannot be the only tool used to determine if a student will be successful in a particular learning environment.

Learning styles theory has contributed to educational research in that the various measurements of learning style provide a framework on which to create learning models that will be useful for the largest number of students in a variety of settings. Additionally, understanding learning styles research assists in developing an understanding of the many dimensions and factors that comprise the learning environment. Kolb has suggested that learning takes place on a variety of dimensions or stages of a cycle. Individuals begin their learning journey at various points in the cycle and can develop learning strategies to move through the stages of the cycle to maximize their learning experience. In this way students work from their preferred learning style towards learning strategies that utilize their less developed styles and grow more independent through this learning experience.

Of all of the learning styles theory reviewed in this section, Kolb's may be the most appropriate for distance education involving adult learners. According to Kolb's theory all learners move through the different stages of the learning cycle as they progress through their studies. This holistic approach to learning suggests that individuals can be encouraged to develop their least preferred ways of learning in order to become more independent learners; which is an important element of student success in the DE environment.

CHAPTER 3: Methodology

Research Design

The methodology used in this study was a multiple case study. According to Merriam (1998) “A case study design is employed to gain an in-depth understanding of the situation and meaning for those involved. The interest is in the process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation” (p. 19). This methodology was appropriate for this study as my intent was to study the interaction of learning style with student perceptions of what contributes to their success, the methods of accommodation that individuals employ and ways that instructors can facilitate positive learning outcomes in the distance learning environment. Further, I was interested in developing an understanding of how learning style contributes to student success in the distance education environment. According to Merriam (1998) the case study methodology achieves this by gathering descriptive data which is “used to develop conceptual categories, to illustrate, support or challenge theoretical assumptions held prior to data gathering” (p. 38). This study is considered a multiple case study because I explored the relationship between learning style and student success for several participants. According to Yin (2006) the multiple case study approach “might help to strengthen your findings in the entire study because the multiple cases might have been chosen as replications of each other, as deliberate and contrasting comparisons, or as hypothesized variations” (p. 114). Using the multiple case study approach I was able to explore the learning styles of several individuals. I was also able to speculate how the differences in learning style may impact student success. In this study the

Experiential Learning cycle theory as proposed by Kolb (1984) was used as the theoretical framework guiding this study.

Procedure

The Kolb LSI was administered to distance education students in the Career Practitioner Program via e-mail, fax or postal services (see Appendix C for a copy of the Kolb LSI and the following section entitled Apparatus for a brief description of it). The participants returned the completed self-scored LSI results by e-mail, fax or postal service. Once I received the participants completed LSI I contacted participants by e-mail to arrange a convenient time for a tape recorded telephone interview to discuss the results of the Kolb LSI and to ask them questions to further explore the impact of learning style on successful participation in their program of study (see appendix F for a list of questions). Attached to the e-mail was a short written summary of the strengths and weaknesses of their learning style. In my email message I advised the participants that we could discuss this summary further during our telephone interview, if they chose to participate in the interview portion of my study. Although I had initially anticipated that the participants chosen for the questionnaire would be a random selection of four or five individuals representing each of the four different Kolb categories; the low participation rate did not allow for this. The questions for the interview were guided by the theoretical framework of Kolb's (1984) Experiential Learning Theory. After asking participants some demographic questions and their perception on learning style I asked the participants if they had any questions about the results of their Kolb LSI style. Those individuals who completed the Kolb LSI and the telephone interview received verbal feedback, while those who completed the Kolb LSI only received an e-mailed comment summarizing what their LSI scores mean.

The data resulting from the Kolb LSI and the telephone interview were then collected and analyzed to compare reported learning style match (or mismatch) with perceptions of success in the course as identified by participants.

Using the results of the learning style inventory I developed a deeper understanding of how learning style impacts participation in a distance education program. Specifically I requested that participants answer questions about why they chose to study through a distance education program and how well this method met their learning style. These data were then analyzed within the context of the experiential learning cycle as outlined by Kolb (1984).

Apparatus

The Kolb LSI was the instrument used to determine learning style. It consists of 12 incomplete sentences where participants are asked to rank order four possible choices to end the sentence. From this information their learning mode was determined dependant on their score on each of the dimensions. These dimensions were then grouped together to determine an individual's learning style. The Kolb LSI was chosen for ease of use, short number of questions and because of its relationship to the theory of experiential learning which measures learning as a cycle. The experiential learning cycle as presented by Kolb (1984) offers an explanation of the interrelation of a number of learning strategies employed by individuals and suggests that educators can facilitate learning around the cycle to optimize growth towards independent learning.

There was also a taped telephone interview administered to participants who were selected and agreed to be included in the study (see appendix E for letter of permission and appendix F for a list of questions). These questions guided the discussion between the participant and me to develop a better understanding of how distance education students in the

Career Practitioner program perceive the relationship between learning style and success. This was a semi structured interview where I gathered specific demographic information. I also included open ended questions to allow for participants to freely share what they believe to be the relationship between learning style and success in their program of distance education.

Ethical treatment of Human Subjects

A letter was sent through the program director who posted it on the Career Practitioner WebCT site explaining the purposes of the of the research and requesting permission from participants to use the results of the Kolb learning style inventory (LSI) along with participation in a telephone interview if selected (see appendix F). Respondents to the letter of invitation and request for participation were sent a copy of the Kolb LSI for self scoring. Once the completed LSI was returned a mutually convenient time for a tape recorded telephone interview was arranged with those selected for the interview. Prior to analyzing the data gathered from the Kolb LSI and tape recorded telephone interview, the participants were sent a transcript of the discussion and analysis for their review and verification. I was then able to gather their responses for analysis. The information gathered and transcribed from the tape recorded telephone interviews was analyzed to determine patterns related to perceived match of learning style to course components as reported by participants in the study in their LSI results. Data were collected in the spring of 2006.

Participants

Participants in this study included students participating in the Career Practitioner Development program at Conestoga College in Kitchener, Ontario. This program is delivered in an online distance learning environment. The total number of students in this program at the time of the study was approximately 140. Most of these students (approximately 90%) were

female. As well about 60% of the students were currently working in the field of career development and looking to enhance their professional credentials. Approximately 55% of the students were over the age of 30. One factor which affected the participation rate was that there were fewer students studying in the spring/summer term. Although all 17 students consenting to participate in the study were given the Kolb LSI, only 15 people representing three of the four learning styles were available for a telephone interview. This population was chosen primarily for access and convenience. A second reason for studying participants in this program was because the participants represent a fairly homogenous group. An homogenous group like this was advantageous for this study because I could anticipate that there would be similarity in their results on the Kolb learning style inventory. If there were large discrepancies, perhaps it is due to factors that may have been overlooked in the research design. One would also expect that because the group is fairly homogenous that this study could be replicated with a similar student population and similar results would be obtained. According to Borg and Gall (1974) there are advantages and disadvantages to studying a narrowly defined homogeneous population. For example “If the research worker defines his [sic] population narrowly, the results of his[sic] research on a sample of this population will be generalizable only to the narrow population, although the results may have implications for a broader population having similar characteristics” (p. 115).

Data Collection

The purpose of this study was to gather information about learning style (as measured by the Kolb LSI) and determine if success is influenced by learning styles. Specifically data were gathered to determine if there is a relationship between learning style and student perceptions of success (defined as the perceived ability of the student to meet the learning

outcome objectives of the program). The information gathered was used to make recommendations on ways to accommodate for the individual differences in learning style for participants in distance education programs. The Kolb learning style inventory was the measurement used to determine learning style and was sent by postal service, email or fax to participants to determine learning style. Although it was self scored, it was returned to me via postal service, email or fax for interpretation and analysis. The knowledge about learning style was enhanced by requesting that participants answer a series of questions related to their learning style during a telephone interview. Their answers along with the results from the Kolb LSI were analyzed to determine the nature and extent of the impact of learning style upon student success.

Data analysis was conducted using the case study method as described by Merriam (1998). The reason for choosing a case study for this research was that the case study allows for in depth analysis of a particular group who occupy a similar background. In depth analysis is useful for building an understanding of issues related to a theory such as learning style in this research. According to Neuman (2003) the researcher “carefully selects one or a few key cases to illustrate an issue and analytically study it (or them) in detail” (p. 33). In depth analysis provided me with an opportunity to consider many aspects of the particular concept under investigation. For example with a better understanding of how students employ different strategies for each learning task, we may be better able to recommend a variety of learning activities from which students can select to suit their particular learning style. As well when students understand their strengths and areas for improvement in a learning situation, they can adapt their learning strategies by finding ways to enhance their skills in a less preferred area of the experiential learning cycle.

CHAPTER 4: Data Analysis

The purpose of this study was to explore the interaction between learning style and the methods of accommodation that individuals employ when learning at a distance. I focused specifically on how learner success might be influenced by learning style for Career Development Practitioner distance education students. I also examined methods of accommodation used by Career Development Practitioner distance education students with differing learning styles when studying. Finally I explored some of the ways that instructors can facilitate positive learning outcomes in the distance learning environment.

The participants for this study were completing a diploma in a Career Development Practitioner program offered through distance education at a community college in Southwestern Ontario. Eighteen individuals responded to my request for participants for this study and 15 completed the Learning Style Inventory. Of these participants all 15 also agreed to be interviewed. Three of the possible four different learning styles were represented by the 15 participants. Five participants identified themselves as having an Accommodating learning style, three identified an Assimilating learning style and the remaining seven identified having a Diverging learning style. Most of the participants had previous college or university education but few had experience with distance education prior to enrolling in this program. Although some participants were working in the field of Career Development, many agreed that the reason for taking this particular program was to enhance their employment prospects and insure their continued employability in the field of Career Development.

Telephone interviews were completed to elicit participant's thoughts on how they are able to achieve positive learning outcomes in the distance learning environment. These findings were intended to contribute to an understanding of how distance education students and distance educators use various learning strategies and teaching methodology to address the

diverse learning styles in the distance education environment. An assumption underpinning this study was that if educators understand that there are differing learning strategies that individuals employ dependant upon the learning situations, they may be able to assist their students in determining the most effective learning strategies to adapt to the distance education courses they study. The concept of adapting the method of course delivery to facilitate the diversity of student learning styles is supported by O'Connor (1997): "Faculty can engage students in more rich learning opportunities by increasing the range of styles through which students can engage in studying academic fields" (p. 2).

After each telephone interview was conducted I analyzed the transcripts to explore themes that were emerging from the data. Neuman (2003) suggests that "qualitative researchers conceptualize or form concepts as they read through and ask critical questions of data" (p. 441).

A number of themes and topics emerged from the data related to concepts such as learning style and learning outcome, how the learning applies to the work participants engage in, how participants are able to use their work experiences to inform their learning, why participants choose distance education, what they find challenging about learning through distance education, which learning tools they find useful in their distance learning, and whether they believed that the Learning Style Inventory was an accurate reflection of the way that they learned. The above noted themes are explored in more depth in the discussion that follows. Where direct quotes from participants were used, a pseudonym was applied to credit the participant's reflections and protect their anonymity. The themes discussed here emerged through a combination of open coding and axial coding (Neuman, 2003). Open coding was initially used to explore the themes that emerged from the questions asked during the telephone interview. I found this type of coding useful in identifying recurring themes and key

concepts (Neuman, 2003). During a second review of the data axial coding was used to determine “causes and consequences, conditions and interactions, strategies and processes and look for categories or concepts that cluster together” (Neuman, 2003, p. 444).

Learning Style and Learning Outcomes

The first theme to emerge revolved around the concept that differences between learning style and learning outcomes are not necessarily related to learning style. Instead participants who had prior experience with the learning material may have found the concepts easier to grasp. Similarly, those who were able to apply what they were learning to their current employment seemed to find the learning materials more helpful. From an experiential learning framework it seems that those who were able to integrate learning and work experience developed a richer understanding of the learning materials than those without prior experience.

For example when participants were asked: “In what ways do you find the courses you are currently studying helpful to your job?” those participants who were working in a related field indicated that they used specific techniques that they had learned in class. Of the 15 participants in the study only nine were working in a related field. One of the participants who was working in a related field explained that the courses helped her in a practical way. She shared “The whole program gave me good information on exactly what to do as opposed to theoretical understanding of how interesting it all is which is great also. Compared to the university courses I had I would say it was very helpful in just kind of giving me the tools” (Mary, Telephone interview). This theme of the Career Development Practitioner programmes practical application to the participants daily work was a common theme as another participant indicated that “The interviewing, mentoring and coaching *course* (italics added by author for

clarification) is an excellent one because it just lends itself to the daily employment counselling that you are doing” (Lisa, Telephone interview).

In respect to learning styles and learning outcomes, participants shared the various strategies that have helped them to apply the concepts they learned to the work that they do. This relates to the experiential learning framework in that those participants who were able to integrate learning and work experience developed a richer understanding of the learning materials than those without prior experience. In the next section I explore this theme in more depth.

Applicability of Learning to Work

Another theme that emerged from the analysis of the data concerns how individuals relate what they are learning to how they work. Specifically one participant mentioned that while doing a project as part of a course on career development with special needs clients she found that “The research that I did (*for the particular course*) and the in depth questions to our clients that I interviewed for that assignment gave me... an amazing understanding of the barriers they face” (Ann, Telephone Interview). By using the clients in her work place to apply the principles she was learning in her course, she gained insight to help her enhance her work skills and become more empathetic to the barriers preventing them from obtaining work. Another participant discussed a particular tool that she learned about in one of her classes and uses on a regular basis in her work with clients. She called it the “Pride Technique” and describes it as being useful in “a situation where a client doesn’t have much work experience and they don’t know what kind of job they should be looking for ...it helps them to focus on self-exploration to see what they are good at and it’s been very effective” (Karen, Telephone interview). In both of the examples illustrated above the participants learned from experience

by applying a concept learned in their program of studies to their day to day work. In essence they were able to transform the theory learned into practical application; this is a key component of Kolb's Experiential Learning theory.

On this topic, participants shared how they were able to apply what they learned in their studies to the work they do. In the next section I explore how participants were able to use their work experience to inform their learning.

Application of Work to Learning Experience

A related topic that emerged from analysis of the data was how participants were able to take the work they do and apply it to their learning experience. Analysis by the participants of their work experience for the purpose of educational application seemed to be a bit more difficult for the participants in this study because they either had not had related experience prior to attending the program or they had difficulty understanding ways to connect their work to their study. One notable exception was a participant who had worked on a group project using her clients as a test case and then took the information she gathered for the group project to develop a workshop on job skills development. She states that she and several other co-workers "took the group facilitation course and so together for our final assignment we developed a transferable skills workshop which was almost directly inputted into the working environment" (Ann, Telephone Interview). Essentially, this participant was able to transfer prior knowledge to her studies, transform this knowledge and then use this in her daily work delivering skills development workshops to other clients.

One participant noted that "just about everything I have done at work I have used in the courses. So it has come from concrete experience and transferred into being able to participate in the courses in that way" (Diane, Telephone interview). In this example the

participant was able to bridge her work to her learning by identifying how her work experience helped her to understand the courses she was studying. For another participant, using her work as a case study for one of her courses helped her to improve how she is able to do her work. She states that “watching the tape I was at least able to recognize what I was doing wrong and with lots of practice since I can see where I have improved. But it was a good way to review how I was doing at that point; how much I was putting into practice. I knew it quite well theoretically but the practice comes a little bit harder” (Karen, Telephone interview). For her the experience of reflecting on how the theory she learned in class translates to practical experience in the workplace involved reviewing her mistakes and applying the theory she learned to correct them. She did this by progressing from the abstract conceptualization stage of the learning cycle to the active experimentation stage.

These comments revealed that participants who were working in an occupation related to their studies were able to use their work to inform their learning. They were able to move through the various stages of the learning cycle to translate experience into learning concepts. In the next section of this chapter I discuss how the independent nature of distance education suited the learning needs of many of the participants in this study.

Reasons for Choosing Distance Education

Another theme that emerged from the data relates to the issue of why participants chose to study in the distance education environment. For many participants the primary reason for studying in a distance education program is that it is convenient to schedule their learning around work and family responsibilities. As one participant reflected “I am a member of the sandwich generation for me to do a night school class with three teenage kids at home, a husband who travels for work and my mother in law with dementia living with me...going out

at night to go to night school for me is just a non starter” (Ann, Telephone interview); suggesting that the convenience of the schedule regarding her studies was what lead her to pursue her education through distance education. Related to the concept of fitting learning into her lifestyle demands one participant mused that “I live in a very unique setting with aboriginal groups and it’s not something I want to leave. My experiences I had when I lived here would be very different if I moved to an urban setting” (Diane, Telephone interview). As well a common theme that was expressed by participants was the convenience of the hours. As one participant observed “I can get up at 6 in the morning and log in to do my homework...I can log in on my lunch hour and work on my homework pieces or tune in to the classes or whatever” (Ann, Telephone interview). These participants have indicated that it is not only the convenience of time that attracted them to study at a distance but the convenience of being able to maintain the lifestyle they choose.

In the next section I review some of the ways that participants find distance learning a challenge to their learning style.

Challenges of Distance Learning

Other findings that emerged from my analysis of the data indicate that there were similarities in which aspects of learning through distance education participants found challenging. For example many people found group work challenging regardless of their learning style. Although the reasons for this challenge varied; a common theme was that it was difficult for participants to coordinate schedules for projects with other students who were geographically dispersed, had differing levels of motivation and personality style. For example a participant who identified as having an accommodating learning style found that the group work was challenging because “everybody has different motivation, everybody has different

learning styles, everyone has different schedules... very challenging” (Cathy, Telephone interview). Although another participant had problems with group work, the problem was with” not getting to know people very well in an online environment I find is not beneficial to group work at all” (Maureen, Telephone interview).

As such, it appears that group work is a challenging activity for many participants regardless of their learning style. In the next section I discuss how participants were able to use various types of learning activities to suit their learning style.

Course Delivery and Learning Style Fit

The issue of whether the content and delivery of the course was a good fit for learning style was another question that offered some relevant data to illustrate the connection between learning style and distance delivery of the course. When the data were analyzed for the answers provided to the question: “*Which learning activities best suits your learning style?*” several themes emerged. The first of these themes was that those who identified as having an Accommodating learning style indicated that they enjoyed the discussion forums because it gave them a way to interact with other participants in the course while at the same time they were able to take their time to reflect on what they wanted to contribute to the discussion forum. As one participant reflected: “Online Asynchronous is my best activity because I can think about what I am reading, do a little bit of research, write it down and then post it” (Sharon, Telephone interview).

Those who had an assimilating learning style also identified the discussion forums as a useful learning activity because they were able draw conclusions from what they read, incorporate it into other learning activities and according to one participant who identified as having an assimilating learning style; she learned best “from both the online postings and

reading the essays and submitting my own essay as that compels me to review all of the material and synthesize it”(Susan, Telephone interview).

Hence, it would seem that those participants who had an assimilating and an accommodating learning style were able to use the asynchronous discussion forums in unique ways dependant upon their own learning style and needs. In the next section I discuss how participants used tele-classes to facilitate learning outcomes.

Tele-Classes as a Learning Tool

Another important theme that emerged from analysis of the data related to the concept of learning activity and the interest expressed by participants in tele-classes. Tele-classes are scheduled for some of the courses in the career practitioner program as a means to facilitate group discussion on topics related to the core curriculum. These classes are scheduled at fixed times and participants call to be available for the class at the prearranged times. The students use standard telephone to dial in to a conference bridge. The discussion is tape recorded for those participants unable to participate at the prearranged times due to work or other commitments. They can then call a number to listen to the tape at a time that is convenient for them within a week of the recording.

For many participants tele-classes represented the closest approximation to the immediacy of a discussion in a traditional classroom environment. They were able to express their views on a topic related to what they were studying. As one participant commented: “I got a lot out of the teleconferences. Because when you are taking independent study; you have a tendency ...of sometimes feeling... of being very isolated. And I found that this would give me a chance to connect voice to voice and this was the first activity that I actually got to have that instant feedback to something that was said”(Joanne, Telephone interview).

For other participants the tele-classes were not scheduled at convenient times because they were working or involved in other commitments. As one participant expressed “I have not participated in many of the teleconferences. I listened to the tapes afterward but again with the flexibility of online learning it seems odd that you’ve got to be there at one time” (Karen, telephone interview). Her concern seemed to be that the tele-classes did not allow for the flexibility that other online learning activities enabled. Several participants clarified the strengths and weaknesses of the tele-class as a learning tool. For participants who were available at the scheduled time and had a diverging learning style it was a useful tool. As discussed earlier in this research one of the characteristics of the diverging learning style is a need to have a personal connection with others in a learning situation. For the participants with a diverging learning style the tele-classes represented the closest approximation to the face to face connection available in an on campus classroom.

In the next section I discuss how participants were able to use a reflective journal to deepen their understanding of the concepts presented in their program of studies.

Reflective Journal to Deepen Understanding of Learning Concepts

One of the questions asked in the telephone interview related to the use of a reflective journal. The purpose of a reflective journal is that students can write about their learning experiences as a means of reflecting on what they have learned. Kolb (1984) suggested that the reflective process is one way of engaging the learner in the learning process. Hubbs and Brand (2005) suggest that “Reflective journaling, selectively guided by the instructor can help the student progress through Kolb’s four stages” (p.62). Hubbs and Brand suggest that the focus of journaling changes dependant upon the stages of the learning cycle.

An analysis of the topic of using a reflective journal to develop a deeper understanding of course concepts elicited some interesting data. Specifically, one participant explained that it was a course requirement for one of her courses and that it helped her to indicate “how relevant the stuff that you’re reading is and how would you use it” (Susan, Telephone interview). Another participant suggested that as part of her internship that she kept a reflective journal which helps her because “it’s nice to go over that and see the progress I’m making for the last three and a half months”. I prompted her to clarify this statement by asking “how does that help; what does going back and reflecting do for you” she added that “because I don’t have any experience in the field yet my confidence is still a little low when it comes to worrying about how I am going to fit into the career development field when I graduate... I guess it’s nice to know that I am actually improving what I am doing” (Maureen, Telephone interview). Finally a participant summarized the relevance of a reflective journal to her work in the career development field by stating that: “It does help me because I can go back and reflect some of the thoughts that I have to a specific situation and I can relate some of those conclusions that I come up with to some real situations” (Linda, Telephone interview).

In all of the above examples the participants were able to use a reflective journal to learn through their work experience and inform the practical application of their learning concepts. The participants in my research were able to move from the stage of reflective observation to active experimentation to both improve their understanding of the concepts and how they could apply the concepts to their work.

In the next section I examine whether participants perceived that the Kolb LSI was an accurate reflection of the way they learned.

Participants Perceived Accuracy of Learning Style Inventory

A theme that emerged when analyzing the data related to whether the learning style inventory results were an accurate reflection of the participants' perception of how they learn. For some participants the Kolb learning style inventory (LSI) accurately described how they learn while for others it did not accurately describe their learning style. An example of how the LSI accurately portrayed learning style was expressed by one participant who reflected that it was accurate in "the part around that I am a generator of ideas; I am good at brainstorming, I am good at generating ideas; that's one of my strong points but I have never actually had it affirmed by anything" (Sharon, Telephone Interview). This participant was identified as having a diverging learning style and she focused on the fact that idea generating is strength of her particular learning style.

While another participant noted that it accurately reflected that: "I sort of sit back and assess what's happening and the fact that I am not a jump in and do sort of person; the fact that I like to learn a lot of stuff about it and then work in a group" (Karen, Telephone interview). Karen also had a diverger learning style but focused on the reflective observation aspect of her learning style. However there were a number of participants who were not as certain about whether the Kolb learning style inventory was an accurate reflection of how they learn. One participant indicated that her approach to learning changes depending on the type of course she is studying. She reflected that she "found it difficult to distinguish between different kinds of learning experiences that I have had and then be accurate in ranking the different styles that I prefer...for instance it might be quite different when it is a course on interviewing and counselling skills if its about trends or thinking through things as opposed to learning a technique" (Mary, Telephone interview). This participant had an assimilating learning style but did not have the description of her learning style that I had supplied her with. I read to her that one of the characteristics of people with her assimilating learning style is that they prefer

thinking, reflecting and observing before taking action. I then asked her if she believed that was true of her. The participant then added that she “had trouble distinguishing between what is ideal for me versus what I do. What you do is not necessarily the best way to learn...like practicing may be the best way to learn but it might not be something you do a whole lot of” (Mary, Telephone interview). For her the difficulty in determining whether the learning style was a good fit or not related to the terminology used in the questionnaire and whether she was evaluating herself on what she felt she should do in a learning situation as opposed to what she actually did.

Another participant reflected that the Kolb LSI only partially reflected her learning style as she thought “my practicality was diminished significantly. And I think that I can be logical or rather practical. But it didn’t seem to be reflected...I felt that was because of the questions and the answers that were available” (in the questionnaire) (Lisa, Telephone interview). This participant had an accommodating learning style. As discussed earlier the accommodating learning style is characterized combining a reliance on intuition and a hands-on approach to learning. However this participant did not see her skills of logic and practicality reflected in the terminology available in either the learning style inventory or the learning style description provided to her. For her the wording of the questions may have been too vague to really describe the way that she prefers to learn.

Summary

The data analyzed in this chapter indicates that regardless of particular learning style employed participants reflected on the common theme of finding ways to integrate what they learned in their distance education courses with the work that they did or the career that they were hoping to pursue upon completion of their education. Specifically participants shared that

strategies such as keeping a reflective journal, participating in tele-classes, and online discussions were all useful tools in transforming their learning into something they could apply to their work environment, regardless of learning style.

CHAPTER 5: SUMMARY, DISCUSSION AND RECOMMENDATIONS

In the previous chapter I discussed the reflections and opinions expressed by participants in this study relating to the themes of learning style and learning outcome. I also discussed the connection between work experiences and learning. Regarding the use of distance education, participants reflected on why they choose distance education, what they find challenging about learning through distance education, which learning tools they find useful in their distance learning, and whether they believed that the Learning Style Inventory was an accurate reflection of the way that they learned. During the interviews the participants discussed their strengths and weaknesses within the distance education framework and related this to their learning style.

In this chapter I draw on the literature associated with learning style and experiential learning to connect how the participants of this study were able to use experiential learning tools to inform their learning. I discuss how participants with differing learning styles use learning strategies to complete the requirements of their programme of studies. I also discuss the limitations of this study and finally, I recommend directions for future research based on the observations analyzed in this and the previous chapter.

Learning Style and Learning Outcome

Three research questions were addressed in this study. The first of these questions relates to how learner success was influenced by learning style for students in the Career

Development Practitioner program at a south western Ontario community college and is discussed in this section.

The other two research questions relate to methods of accommodation employed by distance education students in the Career Development Practitioner program and ways that instructors can facilitate positive learning outcomes in the distance learning environment. The last two issues will be discussed in subsequent sections of this chapter.

While no formal measure of learning success was reviewed (for example no grades were obtained); the fact that all participants in the study had completed at least one other course in their program indicated that they had achieved academic success in their chosen field of studies. Participants related strategies that they had used from their studies which they then applied to the work that they did. This connects with the Kolb experiential learning cycle in that Kolb (1984) suggested that adult learners need to have an opportunity to apply what they learn in the classroom in a practical manner. One of the ways that this is achieved in the Career Development Practitioner program is through the completion of an internship course where participants gain experience in a related community organization and keep a reflective diary of their experiences. While only a small number of participants had completed the internship course, most reflected on the validity of it by referring to the practical experience they anticipated developing through their internship. Those participants, who reflected on the practical application of their program of studies to their current work, were able to make the connections between theory and practice by using various learning tools to their advantage. Rather than employing one learning style, they were using the experiential learning cycle to sense, observe, reflect and achieve. This suggests that learning style is only a small part of learner success in distance education. For the participants in this study the important issue was

how to use the knowledge that they acquired in their program for practical application in the workplace.

When I examined the perceived relationship between identified learning style and self identified learner success, I noted several participants' reflections on the connections between their learning outcomes and their learning style. For example those participants who were identified as having an Accommodating learning style demonstrated that they use their prior knowledge and experience as a frame of reference to relate to the new information they are learning in the program. This relates to the Kolb learning style theory in that individuals who have an accommodating learning style are likely to carry out plans, and adapt to the circumstances of their learning environment.

For some of the participants who were identified as having a diverging learning style, reading and posting information in online discussion forums gave them the opportunity to reflect and synthesize their reflections prior to expanding on them by making a contribution to the discussion forum. As discussed earlier in this research the diverging learning style is characterized by brainstorming, generating ideas and learning through interaction with other people.

The participants who identified having an assimilating learning style demonstrated similarities to other participants in that they emphasized the importance of being able to find a practical application of the theory they had learned in their courses. As discussed earlier the assimilator learning style is characterized by a need to develop logically sound and precise theory. In other words they want to understand why the theory makes sense and they may do this by testing theory against practical application.

In the analysis of learning style and learning success presented in this section, it is important to recognize that individuals will focus on a variety of strategies as suit their

particular learning style. These strategies may take the learner to similar outcomes but they will follow a different path to achieve this outcome.

In the next section I present some of the strategies employed by participants to meet the learning outcomes of the program.

Strategies for meeting the Learning Objectives of the Program

A significant finding that emerged from the data analysis was that most participants stressed the value of being able to apply the theory learned to their present or future work as a Career Development Practitioner. Although some participants were not working in a related field and had not completed the internship course, most participants stressed this as an important element of their programme of studies. This need to be able to translate what they were learning into a practical application resonates with theories of experiential learning, including Kolb's theory. According to Kolb (2005):

Immediate or concrete experiences are the basis for observations and reflections.

These reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences. (p. 2)

In this study the participants reflected on how they were able to transform the knowledge they acquired in the program by applying it to their day to day work as career practitioners. Those who had not had any experience in the field reflected on the knowledge acquired and applied it through their assignments and through group work where they constructed their knowledge by developing a shared understanding with other students in their programme.

When asked about the learning activities that were the best fit for their learning style, participants discussed the importance of asynchronous discussion, tele-class, and other activities that allowed for interaction. The interest in the asynchronous discussions is not surprising given that seven of the 15 participants identified having a diverging learning style. One of the characteristics of the Diverging learning style is that in a learning situation individuals with this learning style would carefully judge the learning situation, reflecting on what they read before taking any action. Another important characteristic of the diverging learning style is the need for learning activities that allow for learner to learner and learner to instructor interaction.

The remainder of participants had either an Accommodating or Assimilating learning style and expressed that the tele-classes and online discussion were useful to help them in integrating the theory with their prior knowledge and experience. As discussed earlier the accommodating learning style is characterized by actively carrying out learning plans. Individuals who have this learning style are able to understand a wide range of information and put it into concise logical form. The assimilating learning style is characterized by the ability to understand a wide range of information and put it into concise logical form.

Another factor that affects learning style is the type of task or problem that an individual is faced with. According to Kolb:

Each task we face requires a corresponding set of skills for effective performance. The effective matching of task demands and personal skills results in an adaptive competence. The Accommodative learning style encompasses a set of competencies that can best be termed Acting skills: Leadership, Initiative, and Action. The Diverging learning style is associated with valuing skills: Relationship, Helping Others, and Sense Making. The Assimilating learning style is related to Thinking

skills: Information Gathering, Information Analysis, and Theory Building (Kolb, 2005, p. 7).

In this study the participants who identified as having an Accommodating Learning style emphasized the importance of taking initiative in projects or essays, immediately being able to use what they have learned in their daily work as career practitioners, and understanding the relationship between concepts learned in their courses. The participants who identified a diverging learning style emphasized the importance of relationship building through the tele-classes, group work and other activities that helped them to acquire the necessary skills to establish rapport with their clients in their work as a Career Practitioner. Finally those participants with an Assimilating learning style related the need to gather information from either online postings, essays or learning resources, analyze it and incorporate it into a theory that would guide their present or future work.

The responses I received to the question “*Which learning activities do you find challenging*” were interesting in that many of the participants expressed that they found group work challenging, regardless of what their learning style results indicated. There are two reasons why this response may have been given. The first reason may be related to the way the question was worded. Rather than asking which learning activities the participant found challenging, I may have had a different response to the question if I had worded the question so that it directly related to their learning style. Another possible reason why most of the participants would have selected group work as their most challenging learning activity could be related to the fact that participants were geographically dispersed throughout Canada and had work and family responsibilities as well as the responsibility of their studies.

Some participants discussed challenges as opportunities. For example one of the participants who expressed that essays are the most challenging learning activity for her also indicated that

this was a good thing because “it’s all about detail and I have to say that I am glad to have to do it because its teaching me a lot about focus and paying attention to detail...but its not something that comes naturally so to me I have to make myself do it” (Emily, telephone interview). This participant suggested that writing essays is a good learning activity because it forces her to use skills that are not strong for her therefore challenging her preferred way of learning. This reflection by Emily illustrates one of the goals of giving students an opportunity to understand learning style; it assists them in developing learning skills beyond their preferred learning style. While learning style represents the typical approach that an individual uses in a learning situation, the basis of Kolb’s LSI is the experiential learning cycle which provides a framework for the development of skills outside one’s own learning style.

In this section I have discussed the ways that students use their preferred learning style to meet the learning demands of their programme. In the section that follows I will discuss some of the strategies that instructors can use to assist their students in meeting the learning objectives of the programme.

How Instructors Facilitate Learning Outcomes

Given the fact that many participants indicated that relationship building was an important element of their learning, it is important that interaction between students is facilitated. One of the ways to facilitate interaction between students is through group project work. However, many participants in this study identified that group project work was difficult due to time and distance constraints. The challenge for the instructor then is to create opportunities for connection between participants while at the same time helping them to understand how to work within the social barriers of distance education. The issue of social

barriers of distance education has been discussed in the literature in relation to the perceived lack of contact with teachers and peers (Galusha, 1997; Wang & Newlin, 2002).

Another issue noted by one of the participants in this study deserves further exploration. One participant noted that there does not seem to be recognition of the fact that some of the students are not full time students and she indicated that “I have not participated in many of the teleconferences. I listened to the tapes afterward but again with the flexibility of online learning it seems odd that you’ve got to be there at one time”(Karen, telephone interview). Her concern seems to indicate that when offering an opportunity for learner to learner interaction, instructors need to keep in mind that adult learners may also have full or part time employment which challenges their ability to participate in these conferences. One suggestion for how to facilitate the unique learning needs of adult learners includes offering them the opportunity to share in learning outcomes by involving them in the learning process such as providing opportunities where they can make decisions about their learning experience (Caffarella & Barnett, 1994). In this case, offering opportunities to have teleclasses at a variety of times may accommodate for the schedules of some of the students who may have full or part time employment. This may also be a way to facilitate shared learning.

For distance educators who are facilitating online learning there is a need to recognize the differences in learning style for students in the distance education environment from traditional face to face learning. One difference noted by Galusha (1997) deserves a closer examination. She observed that:

The teacher is no longer the sole source of knowledge but instead becomes a facilitator to support student learning, while the student actively participates in what and how knowledge is imparted. More than any other teaching method, distance learning

requires a collaborative effort between student and teacher, unbounded by the traditional limits of time, space and single-instructor effort (p. 3).

Since Galusha (1997) wrote the article relating to the barriers of distance learning much has changed. Increasing numbers of instructors in both distance and face to face learning environments see the need for students to take a more active role in knowledge creation. Newer technologies that have emerged since the time of this article enable the student to interact with learning materials in a way that is similar to the face to face classroom. One of the challenges for distance educators is to allow students the freedom to choose from a range of activities that will enable them to do this while still completing the course requirements. In a study by Smith (2006) he observed that many instructors make informal assessments of learning style among their students and adjust their course delivery accordingly. Specifically Smith noted:

...that teachers tended to observe students in context terms, such as whether they liked working with other students in groups, whether they liked working alone, whether they wanted close instructor guidance and attention or just wanted to direct their own learning. It was also clear that teachers observed the way individual students related to and used different delivery formats such as video, computer-based learning, face to face, reading and library study and so on (pg.264).

While Smith's (2006) observations were based on the experiences of educators in both face to face and distance learning environments, the suggestion is that instructors benefit from making informal observations of how their students learn. They do this by trying a variety of teaching methods and learning tools. By facilitating learner choice the instructor can create a learning environment where collaborative learning takes place and the limitations discussed in this section can be minimized.

In the next section I review previous studies related to learning styles and distance education and explain how this study has expanded upon those studies.

How the Results Relate To Previous Studies

As discussed in the literature review of this thesis, previous studies examining the relationship between learning style and distance education focused on the more independent nature of distance education students as compared to in class students (Papp, 2001 Diaz & Cartnal, 1999 Jones and Martinez, 2001). According to Diaz and Cartnal (1999) students with an independent learning style prefer independent study; self paced instruction and would prefer to work alone on course projects rather than with other students. In my research this finding was confirmed as most of the participants indicated group project work was their least preferred learning activity. When commenting on what aspects of their program were most useful, many participants indicated that they liked the fact that they could access the learning materials when it was convenient for them. Finally, few participants indicated that they used learning supports available through the college, which suggests that they were learning the material independently.

Another important issue not directly related to learning style was confirmed in my research. In the literature review section of this thesis I discussed the importance of integrating computer conferencing into course delivery (Galusha, 1997). The reason that it is important to have computer conferencing as a course component is that it allows for learner control of the pace of processing learning materials and it enhances interactivity among participants. This was identified as a learning activity that directly suited the learning style of many of the participants interviewed for my research.

A study of the learning styles of online MBA students (Barnes, Preziosi & Gooden, 2004) suggests that 45% of students studying online prefer a reflective observation style of learning and 30% of the students use an abstract conceptualization style of learning. The authors suggest that as a result of this is that students who employ a Diverging learning style and an Accommodating learning style may be more effective in processing information within the distance education environment. In my research there were seven participants who identified the Diverging learning style as their dominant learning style and five who identified the Accommodating learning style, as their dominant learning style. As suggested by Barnes, et al (2004) this may be related more to the fact that these participants self selected distance education because it suited the independent nature of how they learn. When asked why they chose to study at a distance many participants reflected on the value of being able to access learning materials when it was convenient for them which appears to confirm the findings of Barnes, et. al (2004).

As discussed in an earlier section of my thesis, experiential learning is a valuable framework for understanding and meeting the learning needs of adult learners. Kolb (1984) argues that experiential learning has arisen out of the need for adult learners to have an opportunity to apply what they learn in the classroom to their work and life experiences. This theme was relevant in my research as many of the participants were able to reflect on how they were using the information they were learning in their program of studies to guide their daily work as Career Practitioners. Participants who were working as career practitioners had been able to transform the theory they had learned in their program into tools to assist them in their work with clients.

One of the learning techniques employed in the career practitioner program is tele-classes. Tele-classes are similar to synchronous discussion in that they are scheduled at pre

arranged times and students need to be available at that time to participate in this learning activity. Much has been written in the literature on the importance of opportunities for student to student and student to instructor interaction to create meaning in education (Ehrlich, 2002; Moore, 1996; Muirhead, 2000). Synchronous online discussion forums offer the advantage of immediate feedback and the feeling of an in person discussion (Box, 1999). Since tele-classes are similar to synchronous online discussion in that they allow the possibility of immediate feedback, it seems reasonable to expect that students would find this learning activity useful. However in my research I found mixed results on the usefulness of tele-classes. A few of the participants indicated that they valued the immediate feedback and conversational feel of the tele-classes. Others expressed that tele-classes were challenging due to the time they were scheduled, lack of focus and random nature of discussions. Perhaps the learning style of those individuals who found tele-classes challenging was more reflective in nature and the immediacy of the tele-classes did not allow them the time to think about what the concept meant for them and formulate their response. According to the theory informing the Kolb LSI individuals with a Diverging and Assimilating learning style prefer reflective observation as the means of processing information. In this study there were ten participants who had one of these two learning styles.

In her research on online learning styles Moallem (2003) suggests that varying teaching methods to accommodate for different learning styles allows students to choose learning strategies that suit their particular learning style. Participants in my study identified particular learning activities that they believed to be suitable to their learning style. At least one participant indicated that learning activities that were not matched to her learning style were a challenge and an opportunity to develop her learning skills. The opportunity to have

learning activities that challenge individuals preferred learning style serves the dual purpose of promoting academic growth and developing learning skills around the learning cycle.

In this section I have reviewed ways that my research relates to the literature on experiential learning, learning style and methods of accommodating for learning style difference in the distance education environment. As noted there were similarities to previous findings as well as areas where participants in my research experienced their learning in a different way. In the next section I will discuss some of the limitations of this study and explain why the results of this study might not be transferable to other distance education environments.

Limitations

When examining the results discussed in the previous sections, it is important to remember that there were limitations. Many of the participants of this study were individuals working in the field of career education. For this reason, some of my participants had similar learning styles. It is possible these learning styles are not similar to the diversity of learning styles found in other distance education programs. A second limitation is that there has been much debate on the validity and predictability of learning style as it relates to student success. These criticisms apply to my study as well. A third limitation that I had suspected before I began the study was that the technology used for program interaction may be problematic for some learners and may affect their ability to succeed. The results of the study did not confirm this suspicion. This study was also limited in generalizability to other populations because the sample is representative of a single program.

Another limitation is that a small convenience sample was used. As the data collection portion of the research was completed in July 2006, there were fewer students engaged in

studies in the Career Development Practitioner program. When I posted a message to students in the Career Development Practitioner program at Conestoga College to request volunteers for this study, I received a response from 17 students expressing interest in participating in the study. Of these only 15 followed through with completing the LSI and telephone interview. Perhaps if I had begun my research in September of 2006 there may have been a higher response rate as there would have been more students enrolled in courses at that time. Due to the low response rate I was unable to randomly select participants from a large group. When designing a qualitative case study the ideal situation would have been to have a large enough population that a quota sample could have been selected. The quota method of sampling allows the researcher to identify relevant categories and determine the number of participants in each category (Neuman, 2003). One of the problems with having such a small group of participants was that in my research 14 of the 15 participants were women.

The next limitation I would like to discuss is related to the previous limitation in that the small sample size meant that there was unequal representation of the four learning styles identified by the Kolb LSI. In fact there were no participants who identified as having a converging learning style. A larger sample size may not have provided more variety in learning styles but it may have given me a few participants with a converging learning style. This might have allowed for more comparison of the differences between the four possible learning styles.

Finally, with respect to the numbers of participants; such a low number of participants would make it difficult to generalize these findings to other distance education programs.

The design of the telephone interview questions did not adequately capture some of the issues that arose. Perhaps further exploratory and probing questions would have elicited richer data regarding the challenges encountered by students studying at a distance. Interviewer bias

may have also been responsible for this. According to Neuman (2003), interviewer bias falls into several categories. One of these relates to “unintentional errors such as omitting questions, reading them in the wrong order, recording the wrong answer to a question or misunderstanding the respondent” (p. 297). When I reviewed the transcripts after the interviews were completed I noted that in a couple of the earlier interviews there were places in the interview transcript where I could have probed for a fuller answer to the questions.

The administration of the Kolb LSI via mail may have proven difficult for some participants. One participant commented that she found the wording of the choices on the LSI to be vague. She had difficulty deciding if a particular option was a good description of the way she learned. I did offer participants to e-mail or telephone me with questions if they had any. None of the participants used this option.

Participants who were not working in a field related to their studies found it difficult to make the connection to the experiential learning model. Perhaps this was due to the fact that the Kolb LSI is referenced to learning style but the questions asked in my telephone interview were biased towards the practical application of what participants were learning. In other words one of the assumptions that I made prior to my research was that most if not all participants would be working as career practitioners.

The limitations discussed in this section suggest that making generalizations about the nature of the impact of learning style on learning outcomes for students studying through distance education would be imprudent. This discussion of limitations connects well to the next section. In the next section of this chapter I will present some of the recommendations that emerge from an examination of the limitations as well as reviewing other suggestions for further research in this field.

Recommendations for practice

Several issues related to how educators might accommodate for learning style differences among distance learners emerge from an analysis of the data. Among these are how to accommodate the independent nature of distance learners, how to facilitate social interaction and developing a recognition of the reasons why distance learners have chosen this mode of learning. Given the fact that many participants indicated that relationship building was an important element of their learning, it is important that interaction between students is facilitated. Although there are a number of ways to facilitate interaction between students group project work is the most commonly used. However, many participants in this study identified that group project work was difficult due to time and distance constraints. The challenge for the instructor then is to create opportunities for connection between participants while at the same time helping them to understand how to work within the social barriers of distance education. Instructors might offer alternatives for group project work by providing opportunities for students to create their own groups based on geographic proximity, similarity of interest areas within a course or other learner controlled methods of collaboration.

Another issue noted by one of the participants in this study deserves further exploration. Her concern seems to indicate that when offering an opportunity for learner to learner interaction, instructors need to keep in mind that adult learners may also have full or part time employment which challenges their ability to participate in prearranged, time defined learning activities (such as teleclasses). One suggestion for how to facilitate the unique learning needs of adult learners includes offering them the opportunity to share in learning outcomes by involving them in the learning process such as providing opportunities where they can make decisions about their learning experience (Caffarella & Barnett, 1994). In this case, offering opportunities to have teleclasses at a variety of times may accommodate for the

schedules of some of the students who may have full or part time employment. This may also be a way to facilitate shared learning.

As discussed earlier in this study instructors benefit from making informal observations of how their students learn. They do this by trying a variety of teaching methods and learning tools. By facilitating learner choice the instructor can create a learning environment where collaborative learning takes place and the limitations discussed in this section can be minimized.

The majority of the participants in this study were adult learners and as such valued learning activities that provided them with opportunities to learn skills that had a practical application to the work they were doing. As discussed earlier adult learners need to be able to transform theory into practical application. One of the ways to facilitate this type of learning is to develop course materials that allow for this type of learning outcome. For example, case studies, internships, problem based learning and practicum all fulfill the criteria of learning activities that allow for practical application of theory.

Recommendations for further research

In the previous sections I reviewed the results of my study with the intention of recommending methods instructors can use to facilitate positive learning outcomes in the distance learning environment. In this section I discuss the relationship between learning style and learner success. There has been extensive discussion in the literature about the effectiveness of learning style inventories as a measure of learner success. (Gee, 1990; Diaz & Carnal, 1999; Cassidy, 2004). I will also discuss some of the ways that future research in the area of learning style can address the issues conveyed in my research.

Future studies on the relationship between learning style and learner success might explore the relationship between learning style and the different types of learner interaction. As Moore (1989) discusses there are three types of learner interaction; learner-learner; learner-instructor and learner content. The importance of learner-learner interaction became evident in my research as many participants discussed the fact that they found group work challenging when studying via distance education. This may not have been related to learning style but to some other factors, such as the difficulty of coordinating schedules and work with other group members. An interesting study might be to determine how learner- learner interaction can be enhanced through developing an understanding of how learning style impacts upon this level of interaction. However, given the design of this study and the low response rate to my request for participants, it would be difficult to determine if the challenge of group work was due to learning style or some other factors.

Another important issue that emerged from the analysis of the data warrants further exploration. Regardless of learning style many participants in my study expressed the importance of having opportunities to apply what they learned in their program of studies to their day to day work as career practitioners. This theme of learning through experience also emerged when individuals used their work to inform their studies. They were able to draw from the work they were doing to complete projects for their distance education courses. Future research on learning styles could be designed to explore the connection between how individuals are able to apply theory to practical problems. According to Carafella and Barnett (1994) internships, work placements and apprenticeships are all examples of learning through experience. Problem based learning represents another way that individuals can learn through experience. Problem based learning involves opportunities for students to apply their understanding of theory to practical problems. An article examining the relationship between

learning style and problem based learning suggests that in this type of learning “The problem is presented before students have learned basic knowledge, and it is presented in progressive stages to stimulate students to seek additional knowledge” (Baker, McDaniel, Pesut & Fisher, 2007). Recent studies on the role of experience in learning suggests that problem based learning is an effective way for students to apply the concepts learned to simulations of situations they will use in their careers (Lemieux & Allen, 2007; Baker et. al. 2007).

Participants who were not working in a field related to their studies found it difficult to make the connection to the experiential learning model. This finding seems antithetic to what we know about the adult learning model. According to Carafella & Barnett (1994), there are several common characteristics of adult learners. Among these Carafella suggests that adults pursue post secondary education because of a need to make sense of life experience. Perhaps future studies could explore how an understanding of learning style can contribute to an understanding of the connection between program of study and life experience. This may add to the knowledge base of how to assist adults in developing skills they will need to be successful students as well as becoming successful in their chosen career.

Finally it should be noted that learning style is but one tool related to learner success. The Kolb LSI was a useful tool in this study to determine learning style because of the connection to the experiential learning cycle. Research that contributes to an understanding of how learners use other learning success strategies such as motivation, study skills, locus of control and prior educational experience (Wang & Newlin, 2002) could be useful for educators who want to assist their students in developing skills in all stages of the learning cycle. Perhaps it is not so important that individuals adopt a particular learning style but that they learn how to observe, think, experiment and experience to gain a deeper level of understanding

and application of the connection between the concepts they study and the application to their future work.

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Appendix A -- E-mail signature of thesis Supervisor:

Hi Nancy - I've now heard back from both Liam and Rick, and you are ok to submit your application to ethics.

Best,
Heather

___ This communication is intended for the use of the recipient to whom it is addressed, and may contain confidential, personal, and or privileged information. Please contact us immediately if you are not the intended recipient of this communication, and do not copy, distribute, or take action relying on it. Any communications received in error, or subsequent reply, should be deleted or destroyed.

Appendix B --Kolb LSI and Scoring Key (the Cycle of Learning)

LEARNING-STYLE INVENTORY

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job or at school. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to a "1" for the sentence ending that seems least like the way you learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

Example of completed sentence set:

1. When I learn: 2 I am happy. 1 I am fast. 3 I am logical. 4 I am careful.

Remember: **4** = *most* like you **3** = *second most* like you **2** = *third most* like you **1** = *least* like you

	A		B		C		D	
1. When I learn	—	I like to deal with my feelings	—	I like to think about ideas.	—	I like to be doing things.	—	I like to watch and listen.
2. I learn best when:	—	I listen and watch carefully	—	I rely on logical thinking	—	I trust my hunches and feelings.	—	I work hard to get things done.
3. When I am learning:	—	I tend to reason things out	—	I am responsible about things.	—	I am quiet and reserved.	—	I have strong feelings and reactions
4. I learn by:	—	feeling	—	doing.	—	watching	—	thinking.
5. When I learn:.		I am open to new experiences		I look at all sides of issues.		I like to analyze things, break them down into their parts.		I like to try things out.
6. When I am learning:		I am an observing person.		I am an active person.		I am an intuitive person		I am a logical person.
7. I learn best from:		observation		personal relationships		rational theories		a chance to try out and practice.
8. When I learn: ___		I like to see results from my work.		I like ideas and theories.		I take my time before acting.		I feel personally involved in things.
9. I learn best when:		I rely on my observations		I rely on my feelings		I can try things out for myself		I rely on my ideas.
10. When I am learning:		I am a reserved person.		I am an accepting person.		I am a responsible person.		I am a rational person.
11. When I learn:..		I get involved		I like to observe		I evaluate things.		I like to be active.
12. I learn best when:		I analyze ideas.		I am receptive and open-minded		I am careful.		I am practical.

Appendix C--Evidence of support:

Subject:
Research Proposal
From:
"Bill Jeffrey" <BJEFFREY@conestogac.on.ca>
Date:
Mon, 02 Jan 2006 13:40:24 -0500
To:
<nancylewis@mountaincable.net>
CC:
"Rob Straby" <Rstraby@conestogac.on.ca>

Dear Nancy, please be advised that I have reviewed the research proposal involving our students in the Career Development Practitioner Program. I am providing the necessary approval to conduct the research which includes: working with the Coordinator of the Program (Rob Straby), use of the communications system to recruit the research recipients (on-line), the use of data generated by the students including student marks. This data could only be released with the permission of the students who agree to participate in the research. We would be pleased to support you in other ways if requested to do so and in return we would ask that you forward a copy of your research findings as the outcomes of your research may be useful to the Career Development Practitioner Program delivered in distance delivery.

Please let me know when your proposal has been accepted by the Ethics Committee, Athabasca University. May I wish you the very best in your academic endeavours in completing your thesis and do not hesitate to contact my office if there is any additional support required to complete your research.

Sincerely,

Bill Jeffrey, Associate Vice President
School of Health Sciences, Community Services &
Biotechnology
Conestoga College Institute of Technology and Advanced Learning

E-mail of Approval to use Kolb LSI

Subject:
LSI Research Approval
From:
Michelle_Levine@haygroup.com
Date:
Thu, 27 Oct 2005 15:39:32 -0400
To:
nancylewis@mountaincable.net

Congratulations! Your research request regarding use of the Learning Style Inventory (LSI) has been approved. Attached you will find two documents (.pdf files--Adobe Acrobat 4.05):

* LSItest.pdf - This is a copy of the LSI test. You may print or copy this document as needed for your research.

* LSIprofile.pdf - The profile sheet contains the answer key for the test as well as the profiling graphs for plotting scores. This document may also be reproduced as necessary for your research. The AC-CE score on the Learning Style Type Grid is obtained by subtracting the CE score from the AC score. Similarly, the AE-RO score = AE minus RO.

These files are for data collection only. This permission does not extend to including a copy of these files in your research paper. It should be sufficient to source it.

We wish you luck with your project and look forward to hearing about your results. Please email a copy of your completed research paper to Michelle_Levine@Haygroup.com or mail it to the following address:

LSI Research Contracts
c/o Michelle Levine
HayGroup
116 Huntington Avenue, 4th floor
Boston, MA 02116

If you have any further questions, please let me know.

Regards,
Michelle Levine
Hay Resources Direct
MCB 200C.PDF

Appendix D—Invitation to participate in research study

Dear Student:

Re: Invitation to participate in a research study

I am a Masters of Distance Education student at Athabasca University and I am writing to request your participation in a study that I am completing for my thesis on “THE RELATIONSHIP BETWEEN LEARNING STYLE AND STUDENT SUCCESS IN A DISTANCE EDUCATION PROGRAM”. The purpose of this study is to contribute to an understanding of how distance education students and distance educators can adapt their learning strategies and teaching methodology to meet the diverse learning styles in the virtual classroom. I have previously been in contact with Rob Straby, your Program Coordinator and have his support for the project.

If you agree to participate in this study you will be required to complete a learning style assessment. This assessment should take you approximately 20 minutes to complete. In return I will be providing you with summary information about what the learning style inventory indicates and how this will impact on your learning. A random selection will then be chosen to participate in a telephone interview. If you agree to participate, I will be contacting you to complete a 30 minute telephone interview to ask you questions about learning strategies employed by you. Participation in this study is completely voluntary and your confidentiality and anonymity is assured. The data that I will collect will be coded and your results will not appear individually, but as a part of a group.

If you are interested in participating in this project, please send the attached signed, dated and completed consent form to nancylewis@mountaincable.net and I will send you a copy of the Learning Styles Inventory to gather your response. Once I have received your completed Learning Styles Inventory, I will be contacting you by e-mail to arrange a mutually convenient time for a telephone interview. All information will be held confidential, except when legislation or a professional code of conduct requires that it be reported.

Your completion and return of the attached consent form indicates that you 1) understand to your satisfaction the information provided to you about your participation in this research project, and 2) agree to participate as a research participant. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities. You should feel free to ask for further clarification or new information from myself or my thesis supervisor, Dr. Heather Kanuka (heatherk@athabascau.ca).

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Research Ethics Board (REB) at Athabasca University. The results of this study will be made available in December 2006. If you have difficulty accessing this website, we would be pleased to mail or fax the results. Thank you for your participation.

Sincerely,

Nancy Lewis
(905)383-2454

Appendix D, continued

Consent Form

I, _____ hereby consent to participate in

(Place a check mark beside the activity)

_____ *Completion of the Kolb learning style inventory which will take approximately 20 minutes to complete*

_____ *a 30 minute telephone interview*

for the purpose of gathering data for the research project entitled "THE RELATIONSHIP BETWEEN LEARNING STYLE AND STUDENT SUCCESS IN A DISTANCE EDUCATION PROGRAM." The research will be conducted by Nancy Lewis, in partial fulfillment of Masters of Distance Education studies at Athabasca University, under the supervision of Dr. Heather Kanuka.

I understand and agree that:

- I may withdraw from the research at any time without penalty.
- The researcher, Nancy Lewis has the corresponding right to terminate my participation.
- Aggregated data will be used in the report and all results to ensure both confidentiality and anonymity.
- All data will be kept in a secure place.

I also understand that the results of this research will be used only in presentations and research papers written for the educational community.

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and that you agree to participate. In no way does it waive your rights nor release Nancy Lewis, the researcher, from my professional responsibilities. Your continued participation should be as informed as your initial consent, so please feel free to ask for clarification or information throughout the course of the study.

Signature of participant

Date signed: _____

Please feel free to contact myself if you have any questions. Nancy Lewis (905)383-2454 or nancylewis@mountaincable.net

If you have concerns about the research contact “the research supervisor, Dr. Heather Kanuka heatherk@athabascau.ca, or the Athabasca University Research Ethics Board via janiceg@athabascau.ca”.

Appendix D (Continued)
(Recruitment aids)

Sample of e-mail to be posted on WebCT class site by program coordinator; Rob Straby:

Dear Students of the Career Development Practitioner Program

A Master’s of Distance Education student from Athabasca University in Alberta (Nancy Lewis) is looking for individuals to volunteer to participate in a research project which she is completing to meet the thesis requirements of her program. The title of her study is “The Relationship between Learning Style and Student Success in a Distance Education Program”.

If you choose to participate, you will be asked to complete a Learning Style inventory which will take approximately 15-20 minutes of your time. As well she will be conducting a 30 minute telephone interview with a random selection of participants. She will also send you a more detailed letter about her proposed thesis and a letter of consent for you to sign requesting that you indicate whether you are interested in receiving further information, completing the Learning Style inventory, participating in the telephone interview for research purposes only or any combination of the above activities which you agree to participate in. Participation is voluntary and will in no way affect your performance evaluation or grades. You may choose to withdraw from the research at any time and take your data with you.

If you are interested in volunteering to participate in the study, please contact Nancy at nancylewis@mountaincable.net

Thank you.

Appendix E--Telephone Interview Protocol

My name is Nancy Lewis and I am a Master's of Distance Education student from Athabasca University in Alberta looking for individuals to volunteer to participate in a research project which I am completing to meet the thesis requirements of my program. The title of my study is "The Relationship between Learning Style and Student Success in a Distance Education Program".

Thank you for agreeing to participate in the telephone interview portion of my study. I want to reiterate that your participation is completely voluntary. If there are any questions that I am about to ask you that you do not feel comfortable answering, we can skip over that question or terminate the interview at any time. The information gathered will be for research purposes only and you will not be identified in the transcript developed from this conversation.

If you choose to participate, the telephone interview will take about 30 minutes of your time. Participation is voluntary and will in no way affect your performance evaluation or grades. You may choose to withdraw from the research at any time and take your data with you.

Appendix F--Questions Included in telephone interview

Demographic questions:

1. Age

18 – 24 25 – 34 35 – 44 45 – 54 55 – 64 65 +

2. Gender: *female male*

3. Geographic location _____

4. Is this your first course in the Career Development Practitioner Programme? If not, how many courses have you taken prior to your current course?

Other questions

1. Did you study in or complete another post-secondary program prior to the program you are currently enrolled in at Conestoga? If yes, what was your area of specialization; that is in what field did you obtain a degree/diploma/certificate in?

2. Prior to the Career Practitioner Program did you participate in any other distance education programs?

3. Are you currently in full or part time employment (please specify whether full or part time)
(if **participant is not** working skip to question 9)

4. Is your employment related to your current studies? (If no skip to question 6)

5. If your job is related to your current studies, please describe the nature of the work you are doing (it is not necessary to give the name of the employer)

6. In what ways do you find the courses you are currently studying helpful to your job?

7. Have you been able to complete assignments for any of your classes where you could use an element of your work as a case study for an assignment, ask for an example (give an example to prompt if needed?)

8. Can you describe a time that you took a concept you learned in class and applied it directly to your work and what were the results?

9. Have you ever kept a reflective journal where you recorded your thoughts, feelings and/or ideas about something you have just learned in one of your DE courses? If yes, how did this help you to better understand and apply the concept to the work you do?

10. What attracted you to study in a distance education program?

Possible answers: a) convenience of schedule b) did not want to commute to study c) only option that allowed me to continue to work while studying d) other reasons (please explain)

11. Which of the following learning activities are involved in the course you are presently studying? A) Online asynchronous (whenever it is convenient for you) discussion forums b) synchronous (real time) discussion forums c) essays d) online exams e) group project work f) other (please specify and list all that apply)

12. Which of the following learning activities best suite your learning style? A) Online asynchronous (whenever it is convenient for you) discussion forums b) synchronous (real time) discussion forums c) essays d) online exams e) group project work f) other (please specify and list all that apply)? Please explain why you find these learning activities to be a good fit for your learning style.

13. Which learning activities do you find challenging? Please explain

13. On average how many hours do you spend studying for each course you are currently studying (including readings, assignments, online activity)?

14. Do you make use of the learning supports that are available through Conestoga College? If so please specify which ones (prompts: technical support, tutor support, peer support, others?)

15. What would make the support system more helpful to you? Please explain.

16. Prior to enrolling in the Career Practitioner program what was your level of comfort with using a computer a) none b) limited knowledge c) familiar with various software programs d) expert computer user

17. What is your current level of comfort with using a computer? (Re-read above statements if necessary to elicit response)