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University Educators' Instructional Choices and Their Learning Styles Within a Lesson Framework

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Abstract

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Lucille B. Mazo

MEd, Athabasca University, 2005

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Dissertation Submitted in Partial Fulfillment

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Abstract

Research on learning styles often focuses on the learning style of the student; however, the learning style of the educator may affect instructional choices and student learning. Few studies have addressed the lack of knowledge that exists in universities with respect to educators' learning styles and a lesson framework (development, delivery, and debriefing). This sequential mixed methods study explored university educators' conscious, reflective instructional choices as they related to learning styles application within a lesson. Two theoretical frameworks and one conceptual framework drew on Kolb's experiential learning theory; Bloom's, Reigeluth's, and Gagné's instructional design theories and models; and Fiddler and Marienau's events model of learning from experience. Research questions addressed learning styles, usage patterns, instructional choices, and reflections of university educators within a lesson framework. An online inventory recorded 38 university educators' instructional choices, learning styles, and learning styles patterns within the framework of a lesson. Interviews were conducted with 7 of the university educators to document their conscious reflections regarding their instructional choices. Results from the inventory identified that more than 56% of university educators applied the accommodation learning style during the stages of development and delivery of a lesson, and 34% applied the assimilation learning style during the debriefing stage; these findings were supported by detailed reflections about participants' instructional choices in relation to their learning styles. The knowledge acquired about learning styles applications within a lesson framework may benefit university educators' teaching, thereby providing a foundation for positive social change within academic and social communities.

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Chapter 1: Introduction to the Study

Introduction

Learning is human. Its processes are indelible within learners as they construct, create, shape, transform, and reflect on knowledge acquired for the purposes of achieving wisdom and of understanding the world. Learning does not discriminate, as it is a condition inherent within all humans. The act of learning drives the human need to survive, supporting this survival with the insatiable curiosity to *know*. Conceived from this need is the strong drive to share this knowledge with others through the combined processes of socialization and learning (Bandura, 1971; Parsons, 1951; Vygotsky, 1978). In this study, university educators facilitated the sharing of this knowledge within the instructional framework of a lesson (development, delivery, and debriefing). There are various factors that influence this knowledge exchange, one being the learning styles of an educator. As such, comprehending university educators' conscious reflective instructional choices made within the framework of a lesson and how these choices were influenced by their learning styles provided insights into the ways that educators affected their learning environment. When university educators understand the influence that their learning styles bring to a lesson, students, faculty, administrators, and communities have the opportunity to benefit from positive social change that arises from improved learning conditions.

Chapter 1 commences with a detailed background of the study, providing a brief summary of research literature related to the scope of the topic being researched and describing the knowledge gap that exists within the topic of university educators' conscious reflective instructional choices that are made within the framework of a lesson

in relation to university educators' learning styles. A clear delineation of the problem that underlined this study is articulated within the problem statement, followed by the purpose of the study, which pertained to the connection between university educators' conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing) and their individual learning styles. The method of the study is identified and described, which was the mixed methods sequential explanatory strategy and design (Creswell, 2009, p. 21; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). Details of the collection processes and research questions are communicated, and a discourse on adding to the existing knowledge base is expanded further. This chapter concludes with discussions on the significance of the study through the lens of the academic social system, professional development, curriculum development policy, theory, and positive social change.

Background

One of the established and enduring examples of socialization and learning is intrinsically found within the discipline of education. Identified as a fundamental human right by the United Nations (Universal Declaration of Human Rights, Article 26), education involves teaching individuals for the purposes of learning a new theory, concept, or skill, directly or vicariously (Bandura, 1971; Durkheim, 1956; Parsons, 1951; Vygotsky, 1978). These recognized and prevailing educational environments and contexts also represent a learning zone—a zone of proximal development (Vygotsky, 1978), a place to demonstrate the human qualities and characteristics of learning, communicating, and reflecting. Vygotsky defined his *zone of proximal development* as a learning place where learners discover

functions that have not yet matured, but are in the process of maturation,

functions that will mature tomorrow but are currently in an embryonic state, [and

which include]…those processes that are currently in a state of formation that are

just beginning to mature and develop. (pp. 86-87)

This zone offers a forum where learners and educators articulate ideas, create

communication spaces (de Bono, 1985), develop habits of reflection for meaningful

learning (Fiddler & Marienau, 2008, p. 82), test hypotheses, explore known limits,

expand numerous possibilities (Kolb, 1984, p. 64), and develop unique approaches,

strategies, and patterns of knowing that transform their thinking (Mezirow, 1991). This

zone is also where learners and educators work collaboratively or competitively to gain

information about the world through discussion, discovery, and examination.

In this zone, learners and educators become knowledgeable in the various learning

processes by way of experience, event, practice, experimentation, evaluation, reasoning,

reflection, and application (Fiddler & Marienau, 2008, p. 82; Jarvis, Holford, & Griffin,

1998; Vygotsky, 1978, p. 64). This zone is also a learning situation and environment

where learners and educators develop, sustain, and apply their individual learning styles,

establishing preferences that support their learning needs and choices (Kolb & Kolb,

2005). These learning processes elicit various types of cognitive, physical, and emotional

responses (Fiddler & Marienau, 2008, p. 82), depending on when and how learners and

educators apply their learning style preferences when engaged in meaningful learning and

instruction, when involved in method of inquiry, when absorbed in problem-finding and

problem-solving critical thinking processes, and when responding to consequence

attached to learning and teaching. Learning zones foster creativity, offer potential

solutions, and assist learners and educators in developing understandings and positions on knowledge that is extracted from their own learning and teaching experiences.

An example of a constructed learning zone is a *lesson*, "a period of learning or teaching: a thing learned or to be learned by a pupil; a thing learned by experience" ("Lesson," 2011). According to Smith and Ragan (2005), *lesson* refers to "the amount of instruction that [is] typically completed in one meeting (although lessons may also extend across two or three days, if little time is spent each day)" (p. 128). In both definitions, time and amount of instruction are identified as fundamental components of a lesson, and learner and educator, as well as the processes of learning and teaching, are also components of a lesson. However, these definitions do not address the *instructional framework of* a *lesson*, which entails three main activities: (1) the development of lesson content, (2) the delivery of lesson content, and (3) the debriefing or review of lesson content and delivery after the lesson is completed.

Various researchers have examined learning styles. As discovered by Grasha (2002), the relationship between the teaching style of the educator and the learning style of the learner was critical to developing a learning zone for educators and students. However, Grasha's work did not investigate how learning styles of university educators influenced the reflective instructional choices they made when developing, delivering, and debriefing a lesson. In other words, when a university educator *consciously* made decisions and choices about instructional materials, approaches, techniques, and technology while creating and teaching a lesson and then *consciously* reflected on these choices after the lesson while debriefing on what did and did not work, these processes and knowledge acquisitions were unknown and warranted investigation.

Higher Education and Learning Styles

      The relationship between higher education environments and learning style preferences has been examined extensively (Durkheim, 1956; Felder & Solomon, 1991; Kohlberg, 1973; Kolb, 1984; Piaget, 1973). A plethora of theories, models, and approaches to adult learning processes have been developed to explain the stages, steps, and junctures of learning that offer in-depth descriptions of scaffolding in the form of levels, phases, and types (Dewey, 1963, p.112; Durkheim, 1956, p. 8; Jarvis et al., 1998, p. 54; Kohlberg, 1973, pp. 9-10; Piaget, 1973, p. 36; Vygotsky, 1978, pp. 84-91). Additionally, considerable effort has been directed to the identification of various learning styles, which has advanced human comprehension regarding learning (Dunn & Dunn, 1985; Felder & Solomon, 1991; Gardner, 1999; Kolb, 1984; Rayner & Riding, 1997). However, these researchers have primarily focused on the learning style preferences of students. The intended use and application of student learning style preferences knowledge has been multifaceted, with the following aims: to comprehend students' intricate internal and external learning mechanisms, to understand how students apply these preferences, and to develop strategies for the improvement of student learning. While this knowledge has provided critical information for educators to consider when teaching, the other component that influences a lesson involves the conditions that educators bring to a lesson. Among these conditions are educators' learning style preferences, which they apply within the instructional framework of a lesson (development, delivery, and debriefing).

University Educators and Learning Styles

The learning style preferences of university educators have been given limited deliberation. Significantly less discussion has been devoted to the influence that these preferences have on teaching practices, techniques, approaches, and instructional choices. Further, minimal consideration has been given to the application of these preferences when university educators are engaged in lesson-level development, delivery, and debriefing activities (instructional framework).

Limited significant discussion about university educators and their learning style preferences has been presented. Grasha (2002) alluded to grade school (kindergarten to Grade 12) educators' learning style preferences in his research, which involved comparison of teaching styles and students' learning styles. While it is important to be aware of and to understand this relationship, it does not address the additional condition of an educator's learning styles. As such, a university educator's learning style preferences are different from his or her teaching styles, as educators develop learning style preferences before assuming the role of teacher, and teaching style preferences are informed by an educator's preformed and pre-established learning style preferences.

As learners, university educators have fundamentally developed and sculpted their learning style preferences, which have evolved through the stages of human development and human personality functions and have been applied in different learning circumstances and social environments (Bandura, 1971; Durkheim, 1956; Felder & Solomon, 1991; Jung [1921] 1971; Kohlberg, 1973; Kolb, 1984; Piaget, 1973; Vygotsky, 1978). In his experiential learning theory of growth and development, Kolb (1984) divided the human development process into

three broad development stages of maturation: acquisition, specialization, and integration. By maturational stages, [Kolb was referring] to the rough chronological ordering of ages at which developmental achievements became possible in general conditions of contemporary Western culture. (p. 141)

The *acquisition* stage, which extends between the birth and adolescent years, focuses on learning basic knowledge and developing basic cognitive skills. The *specialization* stage extends from the adolescent to early adulthood years, when individuals concentrate on acquiring specific skills through formal and informal learning situations. This process enables individuals to prepare for the next stage, which is *integration*. Kolb defined and described this final stage of human development as an integrative state of learning and socializing. Transitioning to this third stage requires that a learner transform his or her locus of control or center of decision making from external, or interacting with the world, to internal, or "self as process—transacting with the world" (p. 141).

Each of the learning style preferences that Kolb (1984) identified is associated with a unique approach to the shift from the specialization stage to the integration stage. Understanding how university educators applied their learning style preferences within the instructional framework of a lesson (developing, delivering, and debriefing) was critical to understanding how these preferences shaped educators' reflective instructional choices. Contemplation, reflective skills learning, and experimentation (Jarvis et al., 1998, pp. 54-55) were three types of reflection that university educators potentially engaged in when making these instructional choices. Hence, the relationship between reflection and instructional choices was critical to understanding university educators' application of their learning style preferences within the framework of a lesson.

Reflection, Instructional Choices, and Learning Styles

In general, university educators are expected to develop their lesson materials based on their expertise and on the nature of the topic being taught. Given this process, it is incumbent upon these educators to reflect on the selection of materials they used within the framework of a lesson (developing, delivering, and debriefing). Few studies have deliberated on this reflection process in relation to university educators' learning style preferences. Grasha (2002) examined the teaching styles of grade school teachers, as well as the learning styles of students, presenting an integrated teaching and learning style model that addressed the relationship between these teachers' methods of teaching and the learning approaches of a student. Considerable emphasis was placed on teaching styles that compared with student learning styles. While Grasha recognized learning style preferences, his research focused primarily on students' learning styles and not on those of teachers. Brown (2003) also investigated teachers, but from the perspective of whether their teaching style was influenced by the ways in which they had been taught and learned best (p. 2). However, discourse about university educators' learning styles and reflection was not included, as this was beyond the scope of the research. Likewise, discussion was not provided within the context of the instructional framework of a lesson.

Historically, the relationship between reflection and teaching has been researched considerably (Brookfield, 1995; Fiddler & Marienau, 2008; Habermas, 1992; Janesick, 2004; Phelps, Ellis, & Hase, 2001; Sugerman, Doherty, Garvey, & Gass, 2000; Taylor, Marienau, & Fiddler, 2000). According to Sugerman et al. (2000), university educators who facilitate reflective learning require the skills of assessment, observation, and listening, and they are expected to be cognizant of individual students' feelings (p. 11).

University educators are also expected to be vigilant in evaluating students' physical and emotional states by continually applying a combination of nonverbal and verbal communication approaches in response to students' needs.

Fiddler and Marienau (2008) developed a comprehensive model that presents a unique approach to experience and reflection in learning. Their events model of learning from experience explains the relationships in a learning situation between events, focus of attention, experiences, reflections, and meaningful learning (p. 83). They recognized the inadequate ability of language to describe fully what transpires for any one learner during a learning event and approached this inefficiency by posing a critical question: "What's got my attention?" (p. 83). Within this model, Fiddler and Marienau identified the components of learning from an experience, one of which is the role that reflection plays in this event (p. 83). This model focuses on an event of learning from experience from a learner's perspective and could also be applied equally from the university educator's perspective during a learning event in the classroom. However, in the case of this current study, the learning event from experience involved the university educator reflecting on instructional choices made within the framework of a lesson (development, delivery, and debriefing). Hence, Fiddler and Marienau's model provided a guideline to assess the qualitative data gathered from those participants who agreed to be interviewed in depth.

University educators are critical contributors to the development of programs, courses, and lessons. As part of their role, educators are expected to create comprehensive, learner-centered lessons that provide students with key information about topics. Various factors influence how educators develop their lesson plans, including

context, content, intent, and arrangement of materials (Stark, 2000, p. 413). Additionally, teaching strategies (Bloom, 1956; Gagné, 1987; Grasha, 2002), learning style preferences (Kolb, 1984; Rayner & Riding, 1997), experiences, events, and meaning (Fiddler & Marienau, 2008), as well as instructional choices, elaborations, and reflections (Brookfield, 1995; Kolb, 1984; Reigeluth, 1978), influence educators' decisions about a lesson and influence a lesson's learning outcomes in relation to educators' learning styles. Similar to other learners, educators develop learning style preferences early in life, and these preferences continue to evolve, merge, intermix, and scaffold layers of knowledge, experience, and humanness into a complexly patterned and collaboratively comprehensive system that is used to sustain an educator's advancement of learning and teaching processes.

Despite the integration of a university educator's learning style and teaching style preferences, these preferences are unique in their creation and development and therefore require distinct understanding of their applications. In the case of Grasha's (2002) integrated model of teaching and learning styles (p. 149), both preferences are addressed; however, Grasha focused primarily on the teaching style of the teacher and the learning style of the student. Learning style preferences were not presented from the perspective of the teacher. Currently, few research studies exist that examined the learning style preferences of a university educator and how that educator applied his or her preferences within the instructional framework of a lesson (developing, delivering, and debriefing). Additionally, a university educator's learning style preferences and the conscious reflective instructional choices he or she has made within this framework have been minimally examined.

As such, given that a learner develops his or her learning style preferences prior to becoming a university educator, and given that both learning and teaching style preferences derive from the same individual, who has moved from one role to another (learner to educator), it is with alacrity that the university educator's learning style preferences influence the decisions he or she makes when determining reflective instructional choices such as course and lesson content, assignment and assessment activities, delivery and presentation media, and debriefing and reflective approaches to lesson development and delivery. These choices employ the processes of reflection through contemplation (How do a university educator's learning style preferences inform his or her choices regarding knowledge and theory that are situated within a lesson?), through reflective skills learning (How do a university educator's learning style preferences support the choices that he or she makes to engage students in Socratic dialogue?), through experimentation (How do a university educator's learning style preferences assist in facilitating hypothesis testing in student learning through debate and discussion?; Jarvis et al., 1998, pp. 54-55), as well as through the generation of reflections in the form of ideas and theories from both educators and others (How are a university educator's reflections regarding instructional choices affected by his or her learning style preferences?; Fiddler & Marienau, 2008, p. 82). There exists a gap in knowledge about the relationship between university educators' application of their learning style preferences and the reflective instructional decisions they make within the framework of a lesson (development, delivery, and debriefing). Hence, I sought to learn from investigating this relationship and consider how this knowledge might inform the learning and teaching practices of university educators.

What was challenging to acquire was critical information on how learning style preferences were applied by university educators within the instructional framework of a lesson (developing, delivering, and debriefing). Moreover, there is currently little available useful research related to the following question: How do university educators come to know how the conscious reflective instructional choices they make within the framework of a lesson (developing, delivering, and debriefing) are influenced by their learning styles? This study was needed to determine a response to this overarching question.

Problem Statement

The problem addressed in this study was the following: When university educators make conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing), the influence of their learning style preferences is unknown. In this mixed methods sequential explanatory study, I addressed this problem by first administering an inventory (quantitative) to identify university educators' conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing), to identify their learning style preferences, and to determine their learning style usage patterns as a result of their learning styles. Second, one-on-one interviews were conducted to obtain a deeper explanation and understanding of university educators' concious reflections, attitudes, and behaviors that supported their instructional choices. Researchers in the fields of education and psychology have studied learning styles through various lenses (Felder & Brent, 2005; Ginns, Prosser, & Barrie, 2007; Grasha, 2002; Kolb & Kolb, 2005; Taylor, 2006; Smart & Umbach, 2007), but few to none have viewed learning styles within a lesson framework. With respect to higher

education, it is important and relevant for university educators to know this information because instructional choices for a lesson and the learning style preferences university educators bring to these choices can fundamentally affect teaching practices and subsequently student learning.

New models in the area of learning styles have not been developed within the last 5 years. Grasha (2002) presented his research on a combined teaching (teacher) and learning (student) style model to explain the relationship that exists between these styles that are situated within the learning environment or zone. Additionally, Kolb (1984) has continued to research learning styles within the context of his experiential learning theory and learning styles. More specifically, Kolb and Kolb (2011) developed the Kolb Learning Styles Inventory version 4.0 in collaboration with the Hay Group Consulting Firm. Version 4.0 moved from four learning style types to nine learning style types (initiating, experiencing, imagining, reflecting, analyzing, thinking, deciding, acting, and balancing) and assessed *learning flexibility*, which is the "ability to adapt to the demands of different learning situations" (Hay Group, 2011, paras. 3-4). While Kolb's new KLSI version presented new learning styles, I chose within this research study to remain with the original four learning styles as a theoretical basis, given that their credibility and reliability have been established for over 30 years**.** Ballantyne, Bain, and Packer (1997) examined this relationship through the observations and reflections they synthesized on university teaching academics' stories, as well as through the narrative lenses of these university professors as they expounded on their experiences in teaching and learning. More recently, Fiddler and Marienau (2008) explored the importance of developing habits of reflection for meaningful learning, with the clear understanding that reflection

from both the university educator's and the student's perspectives were critical to ensuring that learning occurred in the classroom.

Current research has also suggested the need to examine the relationship between educators' learning styles and reflective instructional choices. Hall, Leat, Wall, Higgins, and Edwards (2006) explored the concept of *learning to learn* (pp. 149-151) within the context of how the process of research situates educators in the zone of proximal development (Vygotsky, 1978, p. 74), and as a result positioned educators between the roles of teacher and learner; the next stage or future research could explore how this zone is affected by an educators' learning styles. Ginns, Prosser, and Barrie's (2007) research on students' perspectives in teaching quality in higher education investigated how students viewed teaching and what they considered to be a good university educator. In their study, focus was placed on the students' perspectives, but not on the perspectives of the university educator. As in many other studies, Ginns et al. concentrated on students' views and experiences while subordinating those of the educator. Their study identified the need to examine the other side of the relationship that exists in the classroom—that of the educator, and how this role has a signficant influence on teaching and learning. However, none of these recent studies have focused on the impact that a university educator's learning styles may exert during lesson actitivies. Hence, what has remained is a gap in understanding concerning the relationship between the application of university educators' learning style preferences during a lesson and the reflective instructional choices that they make regarding a lesson.

Purpose of the Study

The purposes of this mixed methods sequential explanatory study were twofold. The first purpose was to identify the conscious reflective instructional choices of university educators within the framework of a lesson (development, delivery, and debriefing), to identify the learning style preferences of university educators as they were applied within this framework, and to determine the learning styles usage pattern based on a coding system (Appendix E) resulting from these applied learning style preferences (quantitative). The *independent variables* included the stage of instructional activity, with three levels (development, delivery, and debriefing), as well as one demographic, which was the discipline/specialty of an educator. Part 1: Lesson Development included four sets of instructional statements, Part II: Lesson Delivery included 12 sets of instructional statements, and Part III: Lesson Debriefing included four sets of instructional statements, all of which were embedded within the structure of the Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008), which I developed (Appendices B-G). As each of the three parts of the inventory was completed, the university educator was asked to make one instructional choice from each set of statements, which identified the dominant learning style applied within each part. The combination of these three dominant learning styles was inserted into a coding system (Appendices E and F), which resulted in determining the learning styles usage pattern of the university educator. The *dependent variables* included learning style based on the 20 instructional choice statements, and one resulting *learning styles usage pattern* (Appendix E). For the purpose of this study, the instructional framework of a lesson was as follows:

Part 1: Develop a Lesson	Part 2: Deliver a Lesson	Part 3: Debrief a Lesson
• Select materials • Develop content	• Deliver content • Present materials	• Review the lesson • Make changes, if needed
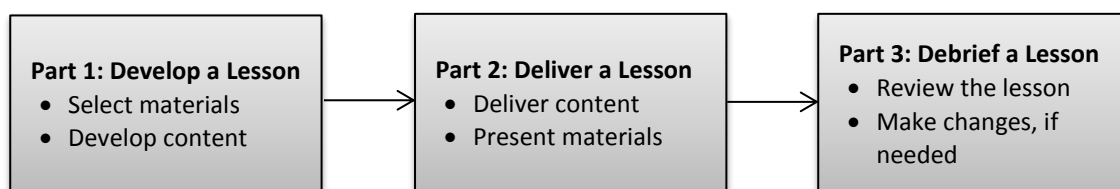
Figure 1. Instructional framework of a lesson within the EICLS Inventory.

The second purpose of this study was to explain the meaning of university educators' conscious reflective instructional choices using in-depth interviews to capture the reflections, attitudes, and rationales attached to these choices. While the outcomes of the EICLS Inventory (Mazo, 2008) included the identification of university educators' instructional choices within a lesson framework, it did not provide an explanation as to *how* and *why* they arrived at their instructional choices. The inclusion of qualitative data gathered in the form of interviews provided triangulation of the results. In-depth information captured through reflections, attitudes, and rationales provided explanations for university educators' instructional choices.

Research Questions

In this study, significant effort and consideration were made to describe, explain, analyze, and interpret the following research questions. All research questions used the terms *university educators* and *educators*, which referred to any educator who taught at a university in the United States and/or in Canada. In relation to this study, the *instructional framework of a lesson* entailed the development of content, its delivery, and its debriefing or review after the lesson was completed (see Definitions of Terms).

Main Research Question for the Study

How are the conscious reflective instructional choices that university educators make within the framework of a lesson (development, delivery, and debriefing) affected by their learning styles?

Quantitative Research Questions

Four quantitative research questions were developed for the purpose of explaining the association between university educators' learning styles and their instructional choices.

1. Do a university educator's dominant learning styles remain constant within the instructional framework of a lesson (development, delivery, and debriefing)?

2. Does a university educator's dominant learning style indicate a specific lesson activity (development, delivery, or debriefing)?

3. Are there specific patterns of usage of university educators' dominant learning styles within the instructional framework of a lesson (development, delivery, and debriefing)? (Note: The quantitative data derived from the EICLS Inventory [Mazo, 2008] participant results. These results were entered into the EICLSup=3[la and dls] coding system to determine the learning styles usage pattern of each educator. Details of the coding system can be found in Appendix E.)

4. Within a discipline/specialty, are there common dominant learning styles applied by university educators within the instructional framework of a lesson (development, delivery, and debriefing)?

Quantitative variables. The independent variables were the stage of instructional activity based on three levels that constitute the basic framework of a lesson (development, delivery, and debriefing) and one demographic (discipline/specialty). The dependent variables studied within the framework of a lesson were university educators' learning styles based on 20 instructional choices (convergent, divergent, accommodation, and assimilation; Kolb, 1984, p. 84), and one resulting learning styles usage pattern based on a coding system (Appendices E and F). Independent variables were measured through the administration of the EICLS Inventory (Mazo, 2008) which was structured on the framework of a lesson (Appendix D). The association that was examined was between university educators' instructional choices they made within the framework of a lesson (development, delivery, and debriefing) and their learning styles.

Qualitative Research Questions

The main qualitative research question was the following: When university educators make instructional choices within the framework of a lesson (development, delivery, and debriefing), what conscious reflections about these choices do they make?

Questions supporting the main qualitative question were as follows:

1. What criteria do university educators use to make conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing)?

2. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their learning styles?

3. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their discipline/specialty?

4. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their teaching experience?

Theoretical Foundation

Considerable discussion and research have been conducted in the area of learning styles. Significant effort has been expended on the development and explanation of learning styles, the basis from which they were established, and the various methods in which they are applied. Additionally, researchers have conducted critical reviews through the lenses of comparison, contrast, and critique with respect to these various theories, models, and frameworks. This study used two theoretical bases: Kolb's (1984, p. 84) experiential learning theory (ELT) and its four learning modes and styles as they inform learning style application, which were based on Jung's ([1921] 1971) four core human functions; and Bloom's (1956), Reigeluth's (1978), and Gagné's (1987) instructional design theories and models as they supported instructional processes. A detailed discussion follows.

Kolb's Experiential Learning Theory and Learning Styles

Kolb's (1984) experiential learning theory (ELT) formed one of the bases of the theoretical framework for this study (p. 84). When developing his theory, Kolb drew from Jung's (as cited in Kolb, 1984, pp. 77-79; [1921] 1971) research on psychological types, which comprised the two personality typologies of introversion and extroversion.

Jung further extrapolated four personality functions within these two typologies: sensing, thinking, intuiting, and feeling. It was these four functions that Kolb used as one of the foundational bases for his ELT. Kolb overtly recognized Jung's knowledge and understanding of human cognition, drawing upon it as a critical foundation that allowed him to expand on his own experiential learning theory (pp. 78-80). Kolb's ELT was also informed by Dewey's (1963), Lewin's (1951), and Piaget's (1973) traditions of experiential learning, identifying within their research various themes including T-groups, action research, democratic values, pragmatism, development, dialectics of learning from experience, and epistemology (p. 17). From these themes and his own research, Kolb deduced that "learning [was] a continuous process grounded in experience" (p. 27).

Within his ELT theory, Kolb (1984) identified four learning styles: convergent, divergent, assimilation, and accommodative (pp. 77-78). Kolb (1984) argued that all four learning styles are integrated when the learner reaches adulthood but also recognized that each learner has a preference for one of these learning styles (pp. 64-65). Kolb (1984) depicted learning as a cycle and explained that learners enter the cycle when and where needed based on experience. As learners, university educators also demonstrate a preference for a learning style, which may affect the way that they develop lesson materials, deliver lessons, and reflect on lesson activities (pp. 64-65).

Kolb's (1984) ELT has been well documented and applied in various methods and approaches by other researchers (p. 84). Two recent and relevant examples are research studies from Koch et al. (2002) and Smart and Umbach (2007). Using Kolb's theory, Koch et al. focused on how continual change in course content and instructor approach

are key factors in impacting student learning. Smart and Umbach's study on how faculty members created curriculum that deliberately targeted key skills, attitudes, and behaviors of students directly related to Kolb's third maturation level of *integration*. The nature of these two studies and the questions posed within these studies are testament to the need to explore the relationship between an educator's lesson creation decisions and learning. As such, knowledge transference and the integration of that knowledge for students are key tasks that educators are expected to perform in their role. Examining this process in combination with university educators' learning styles and how they applied them within the instructional framework of a lesson (development, delivery, and debriefing) was critical to this study. Additionally, how university educators consciously reflected on the choices that they made within this framework was crucial to understanding how their learning styles influenced these choices. Hence, Kolb's ELT was selected for use in this study based on its theoretical structure, which was informed by psychological (Jung, [1921] 1971) and educational research (Dewey, 1963; Lewin, 1951; Piaget, 1973). This structure supported the theoretical underpinnings of this study.

For over 30 years, Kolb's (1984) ELT, learning styles, and Learning Styles Inventory (LSI) have been used by many researchers, with considerable discussion, debate, and dialogue regarding its validity and credibility. This discussion is presented in Chapter 2: The Educational Perspective, which describes the critical reviews that Kolb's theory has undergone by various researchers, who used different criteria and applied comparison and contrast approaches during these reviews. This section also provides a detailed rationale supporting the case for selecting Kolb`s theory in this study.

Instructional Design Theories and Models: Bloom, Reigeluth, and Gagné

Bloom's (1956), Reigeluth's (1978), and Gagné's (1985) instructional design theories and models formed the second theoretical basis for this current study. They informed and shaped the framework, approach, and content used when developing the inventory for the study.

Within Bloom's (1956) taxonomy of educational objectives, three domains are used to classify educational objectives—cognitive, affective, and psychomotor—which include additional subclasses. Within the cognitive domain, the subclasses of knowledge and comprehension (developing a lesson); application, analysis, and synthesis (delivering a lesson); and evaluation (debriefing a lesson) are critical activities that educators engage in while in the stages of lesson planning. Relative to this study, Bloom's theory is used to explain the structure and application of educational objectives in relation to university educators' conscious instructional choices and subsequently their reflections on these choices. However, establishing goals and realizing objectives in a lesson are only two components of learning. Developing the detailed content of a lesson was also required through the processes of rigor and elaboration, as presented in Reigeluth's (1978) elaboration theory.

Reigeluth's (1978) elaboration theory repositions the focus of learning from teacher centric to learner centric. This approach concentrates on the order and sequence of learning content that aligns with learning goals. Reigeluth's theory sustains the principles of instruction, reflecting an understanding that when the arrangement of learning materials is strategically organized and directed to these goals, the learning experience is affected and influenced within the learning environment. Quick assessment

and implementation of the learner and learning situation are critical to the elaboration

theory, which includes three approaches: conceptual elaboration sequence (when

instruction involves numerous related concepts), theoretical elaboration sequence (when

instruction involves numerous related principles), and simplifying conditions sequence

(when instruction involves a task of moderate to high complexity). Reigeluth's theory

informed this study through its examination of ideas for greater accessibility within the

learning environment. Additionally, when university educators were engaged in the

elaborate and complex processes of lesson development, delivery, and debriefing, the

manner in which these processes were influenced by their learning styles was examined

through the lens of the elaboration theory. One of the underpinning concepts that has

informed the field of instructional design is the elaboration of learning outcomes

including declarative knowledge, concepts, principles, procedures, and problem solving

(Smith & Ragan, 2005). While Bloom (1956) focused on learning objectives and

Reigeluth (1978) outlined the elaborate processes of learning, Gagné (1987) provided a

comprehensive theory on the overarching conditions of learning as they are approached

by learners and educators.

There are two aspects of Gagné's (1987) conditions of learning theory: five

learning outcomes: intellectual skills, verbal communication, cognitive strategies, motor

skills, and attitudes; and nine events of learning. These events are foundational in

understanding how sequence plays a critical role in the evolution of a lesson.

Additionally, how the five outcomes are positioned throughout the instructional

framework of a lesson (development, delivery, and debriefing) as university educators

engage in instructional design and delivery provides a structure where flexible adaptation

is facilitated. Hence, Gagné's conditions of learning theory informed this study in that the

five learning outcomes were situated throughout the instructional framework of a lesson.

Additionally, Gagné's theory presented a useful structure, sequence, and logic in its

understanding of how a lesson is delivered in a face-to-face learning environment, which

supported the knowledge underlying the EICLS Inventory (Mazo, 2008) that was used

within this study. In Chapter 2: The Educational Perspective section, I provide

substantive and detailed descriptions of Gagné's, Bloom's (1956), and Reigeluth's (1978)

instructional design theories and models, in addition to expounding on how they were

used in relation to the study and how they informed the underlying approach to the study.

Conceptual Framework

Fiddler and Marienau's (2008) events model of learning from experience and

reflection (p. 82) was the conceptual framework that underpinned the qualitative part of

this study and provided a level of comprehension regarding the relationship between

learning and reflection. Following is a description and discussion of how this model

supported the focus of this study.

Events Model of Learning From Experience and Reflection

Fiddler and Marienau's (2008) events model of learning from experience and

reflection was used in this study as a critical model that demonstrated how educators'

experiences during lesson development and delivery activities were influenced by their

learning styles and then reflected through their debriefing or reviewing activity (p. 82). In

this current study, their model provided the construct of *reflection* as it was applied

within higher education learning and was used to support the definition of reflection as it

was considered in the qualitative interviews. Fiddler and Marienau's model presents the

relationships between four concepts inherent within the learning process: events, experiences, reflection, and meaningful learning (p. 82). In their model, the learner begins by witnessing an event, which subsequently elicits an attention response that is ambient, salient, or focalized, depending on which one the learner selects. The learner then begins to create and develop an experience that is scaffolded into a series of schema that are generated within the learner's short-term memory. This experience is then compared, contrasted, integrated, differentiated, judged, experimented with, and contemplated upon through the process of reflection. This model situates reflection as a critical juncture in learning, as it represents a point in learning that bridges experiences and the meanings attached to them (pp. 82-84). As such, Fiddler and Marienau's model supports the premise that reflection in learning is crucial to moving the learning process from a state of reflection to one that is transformational or that attaches meaning to a learning event and experience (p. 82). In relation to this study, their model provided a framework that was used as a guideline to determine at which point in the learning-from-experience process university educators reflect on their instructional choices within the framework of a lesson. Chapter 2: Reflection in Learning provides a detailed description of Fiddler and Marienau's "Events Model of Learning from Experience" (p. 82) and expands on how it supported this study.

Nature of the Study

In this mixed methods sequential explanatory study, the quantitative collection process that involved the administration of the EICLS Inventory (Mazo, 2008) was used to identify university educators' conscious instructional choices and learning styles within the framework of a lesson (development, delivery, and debriefing); and was used

to determine university educators' learning style usage patterns within each of the three lesson activities. While these data provided critical information about university educators' choices and learning styles within lesson activities, the results from this inventory provided only one perspective on the study. In order to gain a deeper understanding of the inventory responses, rich and thick reflections that supported these educators' conscious instructional choices were captured through qualitative data collection in the form of one-on-one in-depth interviews.

A mixed methods research paradigm with a sequential explanatory design provides adaptive approaches to data collection and allows the researcher greater accommodation of the data (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). Situating the quantitative research paradigm as the first and dominant strategy allowed for the initial collection of university educators' instructional choices and learning style preferences within the framework of a lesson (development, delivery, and debriefing), and subsequently allowed for the determination of educators' learning style usage patterns. Sequencing the qualitative research paradigm within the study as the second part of data collection enabled me to gather data that were enriched with consciously reflective narrative content for analysis, providing a deeper understanding of university educators' instructional choices and explaining their reasons for selecting these choices. Other qualitative research approaches were considered for this study, including phenomenology and grounded theory. Phenomenology involves the study of a small number of participants in order to understand their lived experiences; it was unsuitable for the current study, as there were more than 70 participants. Grounded theory is the study of a specific process or activity and involves multiple stages of data

collection (Creswell, 2009, p. 13). According to Teddlie and Tashakkori (2009),

"grounded theory provided QUAL researchers with a more systematic procedure for

inductively generating theories and analyzing narrative data" (p. 70). Given that I did not

have direct access to the participants in the first part of the study and limited access to

participants in the second part of the study, facilitating the rich narrative data gathering

process of grounded theory would have been significantly challenging. Consequently,

these two research approaches imparted a sense of invasiveness and intrusion into the

participants' lives that was not required. Hence, one-on-one, in-depth interviews were

conducted face to face and via web conferencing communication methods, which

provided sufficient critical data that were used when completing the content analysis

process.

Key Study Variables and Concept

  Quantitative variables. The independent and dependent variables for this study

are defined and described as follows.

  All independent variables within this study were drawn from the EICLS Inventory

(Mazo, 2008). One demographic variable (discipline/speciality) was included at the

beginning of the inventory (Appendices C and D). The stage of instructional activity had

three levels—development, delivery, and debriefing—which, when combined, comprised

the instructional framework of a lesson that formed the structure of the EICLS Inventory.

Within each lesson activity of this framework, university educators were guided through

a series of instructional statements for which they selected their individual instructional

choices (see Appendix D for the sets of instructional statements included under each of

these three levels.). All independent variables are described in detail in Chapter 3:

Research Method.

The dependent variables included one learning style, which was based on 20

statements within the EICLS Inventory (Mazo, 2008), and one learning style usage

pattern based on a coding system (Appendices E and F). University educators' individual

instructional choices made within the framework of a lesson (development, delivery, and

debriefing) were recorded when completing the EICLS Inventory (Mazo, 2008), one

from each of the 20 sets of statements in the inventory. Kolb`s (1984) four learning styles

(convergent, divergent, assimilation, and accommodation) that had been embedded

within the instructional statements were identified when university educators completed

the EICLS Inventory. These learning styles were used to identify university educators'

dominant learning styles within the instructional framework of a lesson. The result was

one learning style for each university educator based on responses within the inventory.

Additionally, one resulting learning style usage pattern was identified by combining

university educators' dominant learning styles within the instructional framework of a

lesson. The pattern was identified by using the EICLSup coding system (Appendices E

and F). All dependent variables are described in detail in Chapter 3: Research Method.

Qualitative concept. There was one key concept that was examined within the

study. University educators' conscious reflections were captured based on their 20

individual instructional choices that were recorded when completing the EICLS

Inventory (Mazo, 2008). In an in-depth structured interview, university educators were

asked to explain and reflect upon their conscious instructional choices.

Statistical Analyses

Statistical software was used to perform the statistical analyses for the data derived from the EICLS Inventory (Mazo, 2008). Descriptive statistics included frequency and percentage for each set of responses for the 20 individual instructional choices.

Methodology of the Study

This study was designed to employ a mixed methods approach using the sequential explanatory research strategy (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). Creswell (2009) stated that mixed methods in research support in-depth triangulation and offer researchers a complex system of research approaches that are not available when only one method is used.

> [The sequential explanatory strategy was] characterized by the collection and analysis of quantitative data in a first phase of research followed by the collection and analysis of qualitative data in a second phase that built on the results of the initial quantitative results. (p. 211)

For Part I: Inventory, I collected quantitative data within a secured online database by using the EICLS Inventory (Mazo, 2008; Appendices B, C, and D). This process recorded the instructional choices university educators made within the framework of a lesson (development, delivery, and debriefing) and simultaneously identified the learning styles and learning style usage patterns of these educators. These data were used in three ways: the 20 instructional choices of the university educator were used to structure the qualitative in-depth interviews that enabled educators to reflect on their choices; the learning styles of university educators were used to identify the

dominant learning styles within each learning activity within the instructional framework

of a lesson (development, delivery, and debriefing); and the three dominant learning

styles that were identified in each learning activity within the instructional framework of

a lesson were used to identify university educators' learning styles usage patterns by

using the coding system of EICLSup = 3(la and ls). For Part II: Interview, qualitative data

were collected from a minimum of 12 university educators by conducting individual in-

depth interviews in order to capture their conscious reflections regarding the instructional

choices they made when completing the EICLS Inventory. Interviews were conducted

using face-to-face and online web-conferencing communication methods, and the EICLS

Inventory was used as a structure to record the responses (Appendix D). Data from the

two parts of the study were integrated to generate inferences and insights connecting

university educators' consciously reflective instructional choices within the framework of

a lesson and their learning styles. See Appendix A for a visual overview of the purposes,

design, variables, and procedures of the study.

Definitions

Significant attention and detail were applied to the process of identifying terms

that were important and foundational to this study. These terms were validated and

authenticated through credible sources that provided transparency to their meanings and

applications. Providing clear definitions and parameters for these terms established a

standardized explanation and description of the critical concepts and constructs that were

used within the study. The following is a comprehensive list of these terms and their

definitions.

Abstract conceptualization (learning mode): "An orientation toward *abstract conceptualization* focuses on using logic, ideas, and concepts. It emphasizes thinking as opposed to feeling a concern with building general theories as opposed to intuitively understanding unique, specific areas, a scientific as opposed to an artistic approach to problems. A person with an abstract-conceptual orientation enjoys and is good at systematic planning, manipulation of abstract symbols, and quantitative analysis. People with this orientation value precision, the rigor and discipline of analyzing ideas, and the aesthetic quality of a neat conceptual system" (Kolb, 1984, p. 69).

Accommodation (learning style): "The accommodative learning style has the opposite strengths from assimilation, emphasizing concrete experience and active experimentation. The greatest strength of this orientation lies in doing things, in carrying out plans and tasks and getting involved in new experiences. The adaptive emphasis of this orientation is on opportunity seeking risk taking and action. This style is called accommodation because it is best suited for those situations where one must adapt oneself to changing immediate circumstances. In situations where the theory or plans do not fit the facts, those with an accommodative style will most likely discard the plan or theory. (With the opposite learning style, assimilation, one would be more likely to disregard or re-examine the facts.) People with an accommodative orientation tend to solve problems in an intuitive trial-and-error manner (Grochow, 1973), relying heavily on other people for information rather than on their own analytic ability (Stabell, 1973). Those with accommodative learning styles are at ease with people but are sometimes seen as impatient and 'pushy'" (Kolb, 1984, p. 78).

Active experimentation (learning mode): "An orientation toward active experimentation focuses on actively influencing people and changing situations, and it emphasizes practical applications as opposed to reflective understanding: a pragmatic concern with what works as opposed to what is absolute truth; an emphasis on doing as opposed to observing. People with an active-experimentation orientation enjoy and are good at getting things accomplished. They are willing to take some risk in order to achieve their objectives. They also value having an influence on the environment around them and like to see results" (Kolb, 1984, p. 69).

Assimilation (learning style): "In assimilation, the dominant learning abilities are abstract conceptualization and reflective observation. The greatest strength of this orientation lies in inductive reasoning and the ability to create theoretical models, in assimilating disparate observations into an integrated explanation (Grochow, 1973). As in convergence, this orientation is less focused on people and more concerned with ideas and abstract concepts; ideas, however, are judged less in this orientation by their practical value. Here, it is more important that the theory be logically sound and precise" (Kolb, 1984, p. 78).

Concrete experience (learning mode): "An orientation toward *concrete experience* focuses on being involved in experiences and dealing with immediate human situations in a personal way. It emphasizes feeling as opposed to thinking, a concern with the uniqueness and complexity of present reality as opposed to theories and generalizations, an intuitive, "artistic" approach as opposed to the systematic, scientific approach to problems. People with concrete-experience orientation enjoy and are good at relating to others. They are often good intuitive decision makers and function well in

unstructured situations. The person with this orientation values relating to people and being involved in real situations, and has an open-minded approach to life" (Kolb, 1984, p. 68).

Conscious: *"*Aware of and responding to one's surroundings; having knowledge of something; (of an action or feeling) deliberate and intentional: *a conscious effort*; (of the mind or a thought) directly perceptible to and under the control of the person concerned" ("Conscious," 2017b). "Perceiving, apprehending, or noticing with a degree of controlled thought or observation" ("Conscious," 2017a).

Convergent (learning style): "The convergent learning style relies primarily on the dominant learning abilities of abstract conceptualization and active experimentation. The greatest strength of this approach lies in problem solving, decision making and the practical application of ideas. We have called this learning style the *converger* because a person with this style seems to do best in situations like conventional intelligence tests, where there is a single correct answer or solution to a question or problem (Torrealba, 1972; Kolb, 1976). In this learning style, knowledge is organized in such a way that through hypothetical-deductive reasoning, it can be focused on specific problems. Liam Hudson's (1966) research on those with this style of learning (using other measures than the LSI) shows that convergent people are controlled in their expression of emotion. They prefer dealing with technical tasks and problems rather than social and interpersonal issues" (Kolb, 1984, p. 77).

Divergent (learning style): "The divergent learning style has the opposite learning strengths from convergence, emphasizing concrete experience and reflective observation. The greatest strength of this orientation lies in imaginative ability and awareness of

meaning and values. The primary adaptive ability of divergence is to view concrete situations from many perspectives and to organize many relationships into a meaningful 'gestalt.' The emphasis in this orientation is on adaptation by observation rather than action. This style is called *diverger* because a person of this performs better in situations that call for generation of alternative ideas and implications, such as a 'brainstorming' idea session. Those oriented toward divergence are interested in people and tend to be imaginative and feeling-oriented" (Kolb, 1984, p. 78).

Instructional framework of a lesson: The framework of a lesson includes the three main instructional activities: (a) development of a lesson, (b) delivery of a lesson, and (c) debriefing of a lesson.

Learning style: "Human individuality results from the pattern or 'program' created by our choices and their consequences. The complex structure of learning allows for the emergence of individual, unique possibility-processing structures or styles of learning. 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).

Learning zone: Recognized and prevailing educational environments and contexts; a zone of proximal development (Vygotsky, 1978); a place to demonstrate the human qualities and characteristics of learning, communicating, and reflecting.

Lesson: "A period of learning or teaching: a thing learned or to be learned by a pupil; a thing learned by experience" ("Lesson," 2011). "By lesson we generally mean the amount of instruction that can typically be completed in one meeting (although

lessons may also extend across two or three days, if little time is spent each day)" (Smith & Ragan, 1999, p. 128).

Lesson debriefing: In relation to this study, processes involved in reviewing a lesson after it has been delivered, including but not limited to critical analysis and reflection of the lesson delivery approach, the lesson content, the learner response to the lesson content, as well as determining what did and did not work within the lesson. It also involves determining whether changes, adjustments, or actions are required that will affect the subsequent lesson.

*Lesson delivery***:** In relation to this study, processes involved in delivering a lesson, including but not limited to the instructional approach, the lesson content organization and sequence, the equipment and materials used within the lesson, the pace and tone of the lesson delivery, and classroom management. It also involves assessment of the learning as it occurs, with the application of various learning strategies to deliver content to learners.

Lesson development: In relation to this study, processes involved in developing a lesson plan that includes three components of the lesson: (a) introduction, (b) body, and (c) conclusion. Lesson development involves selection of lesson content and materials and consideration of learning goals, objectives, and outcomes as they relate to the course and program overall. Development of a lesson also involves researching historical and current information that is relevant to the topic being delivered (Smith & Ragan, 1999, pp. 128-133).

Reflective observation (learning mode): "An orientation toward *reflective observation* focuses on understanding the meaning of ideas and situations by carefully

observing and impartially describing them. It emphasizes understanding as opposed to practical to what will work; an emphasis on reflection as opposed to action. People with a reflective orientation enjoy intuiting the meaning of situations and ideas and are good at seeing their implications. They are good at looking at things from different perspectives and at appreciating different points of view. They like to rely on their own thoughts and feelings to form opinions. People with this orientation value patience, impartiality, and considered thoughtful judgment" (Kolb, 1984, p. 68).

Zone of proximal development: "Those functions that have not yet matured, but are in the process of maturation, functions that will mature tomorrow but [are] currently in an embryonic state, [and that include]…those processes that [are] currently in a state of formation that [are] just beginning to mature and develop" (Vygotsky, 1978, pp. 86-87).

These terms and their definitions were applied within the context of this study, providing a basis for understanding and comprehension.

Assumptions

Assumptions clarify aspects of a study that are believed but cannot be demonstrated to be true. The following list includes assumptions that were made in relation to this study.

1. The holistic-content approach foundational to mixed methods research provided data that are insightful, revealing, and useful. The reason for this assumption was to bring attention to and identify the importance of using a mixed methods research strategy and the understanding that this strategy provided detailed data that supported this study.

2. I assumed that the participant population would be representative enough to provide a useful and purposeful sample. The reason for this assumption was to identify the expectation that the research population would be accessible and useful for the study based on the parameters set by the study.

3. I assumed that the participant population was engaged in the three activities of a lesson framework: development, delivery, and debriefing.

Scope and Delimitations

The scope of the study was articulated within the research problem, which addressed the need to understand the association between university educators' instructional choices within the framework of a lesson (development, delivery, and debriefing) and their learning styles. Additionally, information in the form of conscious reflections about university educators' instructional choices made within the framework of a lesson supported the study's intent to comprehend at a deeper level how learning styles affected instructional choices. By employing a mixed methods sequential explanatory strategy and design (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154), the quantitative and qualitative research paradigms provided an integrated perspective on the results of the study.

The boundaries of the study were indicated within four aspects: the focus was centered on universities; the population was specific to university educators; the population was derived from the countries of the United States and Canada; and the instructional framework constituted the three main activities of a lesson (development, delivery, and debriefing). Given that the study was focused on universities, the participant group was limited to educators from universities where professors, instructors,

and lecturers taught. Further, participants were required to have access to a computer in order to complete the EICLS Inventory (Mazo, 2008) online, and to enable access to those who agreed to participate in the web-conference interview part of the study.

Potential generalizability was presented within the context of three lenses. First, the population derived from two countries (United States and Canada), allowing for a broader representation of university educators based on gender, age, teaching experience, and discipline/specialty. This cross-section of participants provided a diverse base of university educators from which results were drawn and then generalized in context to the population. Second, the EICLS Inventory (Mazo, 2008) is based on Jung's ([1921] 1971) four personality functions and Kolb's (1984) four learning styles, which were developed and designed to address individuals of all types. These theoretical underpinnings provided a basis for generalizing the results across gender, age, teaching experience, and discipline/specialty. Third, the results from the EICLS Inventory were inserted into the EICLSup coding system, which provided specific and overall results with respect to university educators' learning style usage patterns within the framework of a lesson. These patterns were analyzed from the perspective of each lesson activity within a specific discipline/specialty, and from the perspective of the overall general patterns found within the larger group of university educators. Transferability of the qualitative data collected within the in-depth interviews was established through parallels within the quantitative results (instructional choices, learning styles, and learning style usage patterns) with the conscious reflections that supported these results (qualitative results).

Limitations

Limitations of the study are described in relation to design and methodology, as well as any biases, including measures that were used to address these limitations.

Design and Methodology

Given that the study used a sequential explanatory mixed methods design approach, Part I (quantitative inventory) preceded Part II (qualitative in-depth interview). A time limit of 10 days was adhered to between the completion of Part I (inventory) and the completion of Part II (interview). This ensured that the collection of data was managed in a timely manner.

Part I: Inventory involved the administration of the EICLS Inventory (Mazo, 2008) that was developed by me. Given that this inventory had not been used within a previous study, I administered the inventory in a study in 2011 for the purpose of creating a basic level of use before using it within the current study (Appendix G). The EICLS Inventory was designed to use Kolb's (1984) four learning styles as a foundation for developing the sets of instructional statements that were situated within the instructional framework of a lesson (development, delivery, and debriefing) and that defined the structure of the inventory. As such, no other learning styles were used to inform and construct the content within the inventory.

Limitations inherent within the design of the EICLS Inventory (Mazo, 2008) with respect to the selection of population included the following criteria: must be university educators, must live in the United States or Canada, must have taught within the previous 12 months at a university, and must be 18 years or older. These parameters provided clear

boundaries for the study in terms of participants and minimized confounding variables such as teaching approaches and cultural differences.

Researcher Biases

Given that I am a university educator who has taught since 1994, recognizing the biases of teaching experience, knowledge, and comprehension regarding the university environment and processes was important in data collection processes. Measures taken to minimize these biases were twofold:

1. Part I: EICLS Inventory (Mazo, 2008) enabled the participants to be anonymous, as their names were not included in the data gathering process.

2. For Part II: Interviews, only those participants who signed consent forms to participate in an interview were contacted. As a result, the identities of seven participants from Part I: Inventory were known by way of the interviews. Analysis of the interview data was reviewed by an experienced educator.

General limitations relevant to and considered for this study included the following:

1. Individual participants' willingness to participate and to complete the quantitative research inventory was a potential limitation.

2. Individual participants' willingness to participate and to complete the qualitative one-on-one, in-depth interview was a potential limitation.

3. Participants' willingness to share reflections regarding their responses to the EICLS Inventory (Mazo, 2008) was a potential limitation.

Hence, these limitations enunciated the parameters in which this study was conducted.

Significance of the Study

Three critical areas of discussion are identified, described, and explained with respect to the significance of the study: addition to the knowledge base, application of this knowledge in a professional context, and positive social change.

Addition to Knowledge Base

With an increasing demand for university professors, lecturers, and instructors to bridge the gap between educator and student, additional resources that assist educators in achieving this goal are critical to improving this educational relationship. The significance of this study resides in the effort to establish knowledge and improve awareness of how university educators' learning styles influenced their decisions regarding instructional choices within the framework of a lesson (development, delivery, and debriefing). Although a plethora of studies have been conducted on students' learning styles, minimal research has been done in the area of educators' learning styles. More specifically, minimal research has been done with regard to the relationship between university educators' conscious, reflective instructional choices and their learning styles while engaged in the three main activities of a lesson. Hence, the focus of this research study was the conscious, reflective instructional choices of university educators and their learning styles. Currently, no known studies have examined this connection. As such, this study aimed to add new knowledge to the area of instructional choices and learning styles within the context of a lesson framework (development, delivery, and debriefing).

Application of New Knowledge in a Professional Context

The significance and application of this new knowledge can be far reaching, with applications at various levels. Description, explanation, and discussion regarding these applications follow.

Higher education institutional level and application of new knowledge.
Higher education institutions have allocated significant resources dedicated to researching, developing, and designing new and innovative teaching and learning approaches and strategies that facilitate and support student success. As such, these resource allocations require institutional deliberations regarding how and where they are most effectively and efficiently used. Subsequently, new knowledge that informs, guides, and assists an institution in understanding the relationship between learning and teaching approaches and strategies may also be used to improve institutional program and curriculum quality assurance. Such new knowledge may also be used to assist in positioning and strengthening the institution's mission in creating opportunities for philosophical institutional change and curriculum reform. In order to effect these types of transformative changes in teaching and learning approaches, closer examination, deliberation, and deeper institutional reflections were warranted. If an institution's intent is to increase its understanding of the impact of faculty learning styles on student learning, instructional development, course curriculum, and program development, then the creation of an external and internal system that facilitates and supports new and critical learning for faculty is fundamental to this institutional change, both academically and socially. Potentially, implementation of such a system may be realized through institutional policy changes that offer academic, strategic, and community support

through faculty development and community involvement. An example of this change can be viewed institutionally through faculty development programs that are used to assist in shifting perspectives and understandings about teaching, learning, and instructional choices.

Academic Social System Significance

The academic social system of a university is complex, interconnected, and in a constant state of motion as it interchanges resources between its internal academic environment and its external communities. The exchange of ideas that flow from administration, faculty, and students to local, national, and international environments is composite in content and compound in delivery. The academic social system within a university is pivotal to this exchange and is situated within three social frameworks: administrators, educators, and students. Following is an explanation of the significance of these three social frameworks in relation to this study.

Administrators. Within an academic social system, administrators articulate the institutional functions, roles, and responsibilities through decisions that affect both internal (faculty, staff, and students) and external groups (communities). Administrators work with these groups to formulate an academic strategy that meets the needs of all stakeholders in the educational system. Given this scenario, administrators are involved in policy development that sustains the integrity, validity, and credibility of teaching and learning practices. Administrators form part of the discussions that support relevant teaching and learning practices, as well as consider and apply research that informs, recommends, and implements these practices. New knowledge from research provides

information that assists administrators in enabling resources for institutional change required in teaching and learning practices, theory, and philosophy.

In this research study, I examined the relationship between educators' reflective instructional choices and learning styles within the context of a lesson framework that can be used to inform administrators when making decisions about institutional policy changes with respect to teaching and learning practices. This information can also be used to enable administrators in allocating institutional resources in support of additional research in this area, in validating institutional changes, and in developing faculty programs that sustain the changes to these teaching and learning approaches.

Educators. Effective institutional change requires collaboration between administrators and educators. The educator's role in the university social system is critical to the success of institutional change and acts as the agent that is primarily responsible for affecting teaching and learning adjustments and transformations within the learning environment. The university educator's function is paramount in ensuring that the exchange of knowledge, materials, and resources within the institution's boundaries is expedited and that the sharing of this information is advanced with respect to those external academic and social systems located within various communities. This position is complex, given the detailed and comprehensive responsibilities that are inherent within a university educator's role. One key function of this role involves the development, delivery, and debriefing of lessons for dissemination within a learning environment. This development is fundamental to initiating, facilitating, and implementing change in teaching and learning approaches and strategies, as it is a core function of teaching at the university level. Comprehending the intricacies of this

multifaceted role requires examination and research. This study examined one of these facets by investigating how a university educator's learning styles affected the educator's role as instructional designer, the choices that were made when deciding on lesson content and delivery, and the conscious reflections that were made after a lesson was delivered. A deeper, comprehensive, and relational understanding of such a complicated role in a university could be used to assist both institutional direction and faculty development in the areas of teaching and learning.

Students. Administrators and university educators collectively endeavor to provide quality learning to students through institutional policy, comprehensive programming, program self-studies, rigor within program content, and purposeful and meaningful learning. These activities are designed to focus on the intent, form, and culture of learning, which primarily occur within the framework of a lesson event. Given this framework, there is significant importance placed on activities that are inclusive within a lesson: development, delivery, and debriefing. University educators are responsible for determining the direction of a lesson, the parameters of its content, and the methods used to deliver it. Hence, the influence that a university educator exerts on the nature of a lesson directly affects a student's learning outcomes. One of the factors that may influence these outcomes is educators' learning styles, which inform the instructional choices made during lesson planning.

Professional Development Significance

When lesson development, delivery, and debriefing activities are the focus of learning approaches and strategies, professional development becomes a central activity designed to aid in the comprehension of new knowledge and to support new practices.

The academic system does not expect university educators to be well-versed in teaching and learning techniques, and it is not incumbent upon them to be, as educators are not typically hired for their abilities to teach, but rather for their knowledge, research, and experience within their specific field, discipline, or specialty. Few universities have provided programs and courses designed to assist educators in comprehending what it means to be a university educator, why it is important to learn the fundamentals and intricacies of teaching, and why it is crucial to understand the influence that they bring to their teaching role.

Professional development programming that is designed for university educators to improve lesson development, delivery, and debriefing practices in universities is of paramount importance to successful teaching and learning in the classroom. Programs such as Instructional Skills Workshop, Writing Assessment Materials, and Using Technology in the Classroom are used in universities to offer teaching information, strategies, and techniques that are critical to becoming better professors, instructors, and lecturers as knowledge disseminators. Understanding the teaching and learning dynamics within a classroom requires crucial knowledge about the university educator as well. This study was driven by the critical importance and need to educate and inform university educators in the competencies of teaching and learning. Instructional choices and learning styles as outlined in this study were two areas that could be used to inform educators.

Curriculum Development Policy Significance

Defining the direction and fundamental structures and substructures of a program begins with the development of thoughtful and effective curriculum policy that informs a program of study, as well as its course arrangement and configuration and its lesson

content and construction. Program curriculum constitutes the outer framework that shapes its parameters, envelopes its middle purpose, and stabilizes its core competencies and skills. Administrators, faculty, and students who develop curriculum policy as a collective comprehend the power and profundity of policy. When educators are knowledgeable in teaching and learning practices, and when they serve on university policy-development committees, they are positioned to better inform the administration about the importance of developing curriculum policies that support professional development in the areas of instructional design processes and learning styles. This study considered the significant impact that policy changes exert on curriculum development in relation to instructional choices and how they are delivered in the learning environment.

Theoretical Significance

This study is significant in that it provides a basic instructional framework that can be used when determining how educators in higher education institutions (universities, colleges, technical institutes, etc.) use their learning styles within the framework of a lesson (development, delivery, and debriefing). Additionally, the theoretical formula developed for this framework was used to determine the learning styles usage pattern of educators within the framework of these instructional activities, which provided insight into the behaviors of university educators and their learning styles. Further, the study provided a research inventory designed to measure instructional choices and learning styles within the framework of a lesson. Currently, this type of inventory does not exist.

Positive Social Change

While significant research has been conducted on the learning styles of students, minimal research has been done in the area of educators and their learning styles, and more specifically in the areas of higher education. Understanding the influence that educators' learning styles have on learning when selecting and delivering content for courses and lessons is an important aspect of teaching. It is well known that educators in higher education do not possess formal education in curriculum development and instructional design, unless they have completed an education degree program that included this knowledge. Hence, understanding the process of how educators used their learning styles to develop and deliver their course and lesson materials provided insight into how higher education institutions can support those educators responsible for curriculum development and course design. This knowledge can potentially be used at the global level, providing understanding of how educators from other cultures and disciplines make instructional choices and how their learning styles influence lesson development, delivery, and debriefing. This knowledge can provide best practice considerations for higher education institutions when developing curriculum and designing courses within the context of teaching students. The knowledge learned from this study may enable educators and institutions to engage in positive social change that benefits both academic and social communities.

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Summary

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Chapter 1 has focused on outlining and defining the purpose of this sequential explanatory mixed methods research study. Jung's ([1921] 1971) theory on personality typologies and functions, Kolb's (1984) experiential learning theory on learning styles,

and Bloom's (1956), Reigeluth's (1978), and Gagné's (1987) instructional design

theories and models were used to support this current study. Additionally, this study used

Fiddler and Marienau's (2008) "Events Model of Learning from Experience and

Reflection" (p. 82) as a conceptual framework in relation to the conscious reflections

gathered from university educators regarding their instructional choices within the

framework of a lesson. Research questions were defined according to each paradigm:

quantitative and qualitative. This section has defined and described the nature of the

study, provided the problem and purpose statements, and provided detailed descriptions

of the independent and dependent variables.

The following section, Chapter 2: Literature Review, provides information about

the seminal researchers whose work in the areas of psychology, human development, and

education has added to the knowledge areas of instruction and learning.

Chapter 2: Literature Review

Introduction

When university educators are engaged within the framework of a lesson (development, delivery, and debriefing), the relationship between their conscious reflective instructional choices and their learning style preferences is unknown. Educators' learning style preferences can influence the reflective instructional choices they make when developing lesson content, when delivering this content, and when debriefing or reflecting on this content after the lesson. The purpose of this sequential explanatory mixed methods (Creswell, 2009, p. 211) study was to identify, determine, describe, and explain university educators' reflective instructional choices made within the framework of a lesson in relation to their learning style preferences. The goals of this research were to identify university educators' instructional choices within the framework of a lesson, to identify their learning style preferences and learning styles usage patterns, and to attain a deeper understanding of how educators consciously reflect on their instructional choices. In order to achieve these goals, historical and current research was reviewed.

Current Literature and Relevance to Problem

Current research literature is minimal regarding educators' conscious reflective instructional choices made within the framework of a lesson (development, delivery, and debriefing) in relation to their learning styles. Within the past 5 years, there have been no new models developed in the area of learning styles. A teaching/learning style model developed by Grasha (2002) examined the relationship between a teacher's teaching styles and the learning styles of students; however, the focus was on the teaching style

and not the learning style of the educator. Furthermore, Grasha researched teachers'

teaching styles as they related to classroom delivery but did not identify how teachers'

learning styles influenced decisions regarding lesson development, content, and review.

Additionally, Kolb and Kolb (2005) presented new research on learning styles and

learning spaces (2005). Kolb and Kolb (2011) also developed the Kolb Learning Styles

Inventory version 4.0 in collaboration with the Hay Group Consulting Firm. Version 4.0

moves from four learning style types to nine learning style types (initiating, experiencing,

imagining, reflecting, analyzing, thinking, deciding, acting, and balancing) and assesses

learning flexibility, which is "your ability to adapt to the demands of different learning

situations" (Hay Group, 2011, paras. 3-4). However, neither of these research studies

examined how university educators' learning styles influence lesson decision making.

Current research has also suggested the need to examine educators' reflective

instructional choices and their learning styles. In relation to educators' application of

reflective skills and instruction, more recent research has been conducted by Fiddler and

Marienau (2008). They examined the importance of developing habits of reflection for

meaningful learning, with the clear understanding that reflection from both the educator's

and the student's perspective is critical to ensuring that learning occurs in the classroom.

Hall et al. (2006) explored the concept of *learning to learn* within the context of how the

process of research situates educators in the zone of proximal development (Vygotsky,

1978, p. 74) and as a result situated educators between the roles of teacher and learner.

The next stage (or future research) would involve exploring how this zone is influenced

by educators' learning styles. In research on students' perspectives on teaching quality in

higher education, Ginns et al. (2007) investigated how students viewed teaching and the

criteria that constitute a good educator. In their study, focus was placed on the student's perspective, but not on the perspective of the educator. As in many other studies, Ginns et al. (2007) concentrated on the student and not on the educator. However, this study identified the need to examine the other side of the relationship that exists in the classroom—the role of the educator, and how this role influences teaching and learning. While these recent studies have focused on learning styles to a certain extent, none have focused on the influence that an educator's learning styles may exert within the instructional framework of a lesson (development, delivery, and debriefing). Furthermore, the general avoidance of using higher-education educators as a population when conducting research on instruction and learning styles added another layer to this gap in the knowledge.

Chapter Preview

To commence this literature review, a discussion regarding the psychology that supports the theory of learning styles ensues. Jung's ([1921] 1971) seminal research in personality types and functions is described and explained. This segues into a discussion on human development and learning, with a focus on Piaget's (1973) research regarding the stages of human development and how they correlate with learning. Following this discussion, educational perspectives that include the foundational research of Durkheim (1956), Lewin (1951), and Vygotsky (1978) are presented. Additionally, this area provides details on researchers who have contributed to the literature on learning styles and concludes with an extensive discourse on Kolb's (1984) experiential learning theory (ELT), four learning modes, and four learning styles. Further, a detailed discussion of the instructional design theories and models of Bloom (1956), Reigeluth (1978), and Gagné

(1985) provides a theoretical basis for the instructional framework of a lesson that is used within this study. A discussion of reflection and learning concludes this section and includes critical contributors to the area of learning and reflection, including Brookfield (1995) and Fiddler and Marienau (2008).

An additional section presents more current research on learning and learning styles. More specifically, this section provides a detailed synopsis of the work of those who have researched, critiqued, and applied Kolb's (1984) experiential learning theory (ELT), which is one of the fundamental theories that supported the current study. However, in order to facilitate an understanding of the methods used to conduct this literature review, the literature search strategy is described and explained.

Literature Search Strategy

Various search strategies were applied when conducting the literature review for this study. Critical online databases in the fields of education and psychology were used to assemble a comprehensive list of seminal and current researchers who have completed studies in the areas of personality functions, learning styles, instructional design theories and models, and the process of reflection in adult learning and higher education. ERIC, Education Research Complete, Education: A SAGE full-text database, ProQuest Central, Academic Search Complete/Premier, Expanded Academic ASAP, Teacher Reference Centre, Dissertation and Theses, eBrary e-book Collections, eBooks on EBSCOhost, PsychARTICLES, and Web of Knowledge were the key databases that were used to compile a list of critical research that supported the current study. Using the search terms *instructional design strategies, learning styles, higher education educators,* and *reflection*, the search for seminal researchers' articles and books from 1900 to 2000 was

refined in order for specific studies to be found in the databases. This process was repeated employing the same search terms, but focused on current researchers' articles and books from 2000-2012. All articles and books relevant to the study were reviewed through two lenses:

1. Did the work include a core theory that supported the focus of the study?

2. Did the work add to the body of knowledge in the areas that the study was centered on?

In addition to journal articles and books, the ProQuest Dissertations and Theses database as well as the Walden Dissertations and Theses database were searched using the search words *learning styles and professors*: A total of 103 results were listed, with only 5 studies that mentioned the learning styles of university or college professors, instructors, or lecturers. None of these dissertations and theses addressed university educators' conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing) in relation to their learning styles.

Given that there were few studies that directly related to university educators' conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing) and university educators' learning styles, the literature review was approached in three ways to ensure that both historical and current studies upheld the tenets of the study. First, it is important to note that Kolb and Kolb (2012) have developed and currently are piloting an instrument on educators' learning styles, based on the Learning Styles Instrument (LSI) that was originally developed in 1984 by Kolb (Case Western University). Second, seminal theorists' works were identified based on their support of the premises of the study and based on the theoretical foundations they

would provide for the study (Bloom, 1956; Fiddler & Marienau, 2008; Gagné, 1987; Jung; [1921] 1971; Kolb, 1984; Reigeluth, 1978). Third, key researchers who critiqued Kolb's (1984) work on learning styles were included in the discourse and rationale for using his theory and learning styles as one of the foundations for the study. Fourth, current researchers in the areas of instructional strategies, learning styles, and reflection in higher education were added to this discussion as they related to the key areas that were being measured in the study: university educators' instructional choices within the framework of a lesson, learning styles of university educators, university educators' learning styles usage patterns, and conscious reflections of university educators with respect to their instructional choices within the framework of a lesson.

Research Categories Informing the Review

Early and critical research addressing ways in which humans learn originated primarily within the three disciplines of psychology (Jung, [1921] 1971), human development with respect to learning (Kohlberg, 1973, 1984; Piaget, 1973), and education (Durkheim, 1956; Kolb, 1984; Vygotsky, 1978). This section provides a review of the theoretical literature used to inform this study. It comprises three core areas that are related to the focus of this study and to the key variables of this study: instructional design theories and models; psychological, developmental, and educational perspectives in learning; and conscious reflection in higher education. Each area includes seminal and critical research that has advanced the discussion or added to the knowledge of human learning and development. Historical and current research studies were reviewed, considered, and selected based on their ability to present both credible and valid information regarding instruction, learning processes, learning styles, and reflection

as they related to educators and higher education institutions. These designated sources were foundational in determining and defining the parameters, nature, and structure of this study and are presented with a clear purpose of offering various perspectives.

Theoretical Foundation

The theoretical foundation of this study was based on three critical areas related to the variables examined:

1. *Framework of a lesson (development, delivery, and debriefing—independent variables) and university educators' instructional choices (dependent variables).* Instructional design theories and models based on Bloom's (1956), Reigeluth's (1978), and Gagné's (1987) research are presented.

2. *Learning styles and learning styles usage pattern (dependent variables).* Psychological, developmental, and educational underpinnings are presented through the lenses of Jung's ([1921] 1971) personality types, Piaget's (1973) and others' human development stages, and Kolb's (1984) and others' learning processes.

3. *Conscious reflections (qualitative variables).* Reflection and learning are presented through the conceptual framework of Fiddler and Marienau's (2008) "Events Model of Learning from Experience" (p. 82) and Brookfield's (1995) research in the area of reflection.

Framework of a Lesson: Instructional Design Theories and Models

The instructional design theories and models of Bloom (1956), Gagné (1985), and Reigeluth (1978) were used in this current study to inform the theoretical underpinnings of instruction, to assist in articulating the instructional framework of a lesson

(development, delivery, and debriefing), and to structure the instructional statements (there are 20 sets) that are within this framework. These instructional statements were also used to structure the in-depth interviews for Part II: Interview (qualitative) of the study. These interviews were designed to record the conscious reflections of university educators when they were making instructional choices within the framework of a lesson. Bloom's, Gagné's, and Reigeluth's research also supported the quantitative stage (Part I: Inventory), which involved the development of instructional statements that form the core of the EICLS Inventory (Mazo, 2008). How these three approaches to instruction are meaningful to this current study is explained in detail below.

Bloom's (1956) taxonomy of educational objectives proposed that there are three domains in which educational objectives may be classified: cognitive, affective, and psychomotor, which are further divided into subclasses. Within the cognitive domain, the subclasses of knowledge and comprehension (developing a lesson); application, analysis, and synthesis (delivering a lesson); and evaluation (debriefing a lesson) are critical activities that educators engage in while in the stages of lesson planning. The affective domain consists of receiving, responding, valuing, organizing, and characterizing the interests, attitudes, and values of learners that educators are expected to consider when creating lessons. The psychomotor domain focused on motor skills that paralleled motor or mechanical skills learning. This domain was minimally developed by Bloom in the initial release of the taxonomy; however, it was later revisited and fully developed by Krathwohl (2002). Relative to this study, Bloom's theory is used to explain the structure and application of educational objectives in relation to educators' conscious instructional choices and subsequently their reflections on these choices. As such, when educators

develop a lesson, they first gather knowledge through the process of selection of content

and materials; they then study these materials through the process of learning and

comprehending them. Once educators enter the learning environment and deliver the

content and material that were used to develop the lesson, they apply this content through

detailed analysis, as well as through content synthesis to facilitate learners'

comprehension. Finally, the educator assesses the lesson through the process of

evaluation, determining what did and did not work and reflecting on the status,

effectiveness, and feasibility of the learning objective. However, establishing goals and

realizing objectives in a lesson are only two components of learning. Developing the

detailed content of a lesson is also required through the processes of rigor and

elaboration, as presented in Reigeluth's (1978) elaboration theory.

Reigeluth's (1978) insight regarding the shift from teacher-centric to learner-

centric instruction was articulated within his elaboration theory which focused on the

selection and sequencing of content and learning materials in order to augment and

support learning goals. The elaboration theory includes the tenets of sequential

instruction with a holistic approach to teaching and learning, posits that meaning and

motivation attached to a learning experience are critical to knowledge creation, and

recognizes that learners may be given learning sequence decisions during lessons.

Instructional development that accelerates a quick assessment and a rapid implementation

approach to instructional design outcome is also a concept that forms part of this theory,

cohesively assembling and integrating all aspects of instructional development and design

into the learning session and environment. Reigeluth identified three approaches to his

theory: conceptual elaboration sequence (when instruction involves numerous related

concepts), theoretical elaboration sequence (when instruction involves numerous related principles), and simplifying conditions sequence (when instruction involves a task of moderate to high complexity).

Reigeluth's (1978) elaboration theory informed this study on the importance of including, applying, and considering elaboration during the development, delivery, and debriefing processes of a lesson. Elaboration of ideas, how they are integrated through the selection of instructional materials, and how they are influenced by learning styles were examined through the lens of the elaboration theory. One of the underpinning concepts that informs the field of instructional design is the elaboration of learning outcomes including declarative knowledge, concepts, principles, procedures, and problem solving (Smith & Ragan, 2005). However, Gagné (1985) approached learning from a different perspective.

Gagné's (1985) conditions of learning theory comprised two aspects: five learning outcomes including intellectual skills, verbal communication, cognitive strategies, motor skills, and attitudes; and nine events of learning including gaining attention, informing learners of the objectives, stimulating recall of prior learning, presenting the stimulus, providing learning guidance, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer of knowledge. With respect to this study, Gagné's five learning outcomes are situated throughout the three main activities of a lesson, with consideration of all five outcomes throughout all activities. However, significant deliberations and focuses of specific outcomes exist within the three lesson activities For example, the inclusion and application of intellectual skills should be significantly deliberated upon during the first lesson activity of development, design, and

selection of materials; the verbal communication outcome should be significantly considered during the second activity of a lesson (classroom delivery); and the third lesson activity of debriefing and reflection should focus on cognitive strategies that support both educator and learner experiences. Regarding the events of instruction, all nine events need to be considered during the first lesson activity of development to ensure that the second activity of delivery in the classroom and the third level of debriefing after the lesson are informed and structured by the development activity. However, all nine events of instruction also shape the structure, form, and depth of the lesson, with the first two events applied in the introduction of the lesson, the third to seventh events employed during the body of the lesson, and the eighth and ninth events implemented during the closing of the classroom lesson (Smith & Ragan, 2005, p. 129). Gagné's conditions of learning theory informed this study through its structural, sequential, and logical understanding of how a lesson is delivered in a face-to-face learning environment.

Learning Styles: Psychological, Developmental, and Educational Perspectives

The psychological perspective. Jung's ([1921] 1971) influential research on personality types was ground-breaking with respect to understanding the psychological processes that inform an individual's behaviors and that support and shape an individual's attributes and characteristics. Jung's eight psychological personality types and functions provided categories with detailed descriptions about human personalities: extrovert, introvert, judging, perceiving, sensing, intuition, thinking, and feeling. Jung provided specific traits that defined an individual's behavioral preferences and that identified specific patterns of behavior within each personality type.

Kolb (1984) applied Jung's ([1921] 1971) personality types and functions in his research by using them as the base from which he structured and formulated his four learning modes and subsequently his four learning styles. He overtly credited Jung's adaptive processes as directly influencing the development of his his experiential learning theory (pp. 77-78). Briggs and Myers (1990) were two significant and known researchers who also applied Jung's personality types in their Myers-Briggs Type Indicator (MBTI) instrument that measured personalities through 16 types and applied them in various situations, including learning. These 16 types were based on Jung's ([1921] 1971) personality types. Currently, the MBTI is being applied internationally in various learning environments with marked success, but more specifically in business and training sectors within society. Other researchers who have applied Jung's personality types include Honey and Mumford (1992) and Vermunt (1994) who developed their own instruments for measuring learning styles.

While Jung's ([1921] 1971) theory and research focused on personality types and functions and not on learning styles, his research directly impacted Kolb's (1984) work on the development of his experiential learning theory (ELT) model and four learning styles. Kolb's (1984) use and integration of Jung's ([1921] 1971) personality functions established a foundation that supported his work on his four learning modes and learning styles. Hence, both Jung's and Kolb's research and theories supported the scope of research within this current study.

The developmental perspective. Human cognitive development has been examined by numerous researchers, providing insights into the different stages, levels, and phases that humans experience as they grow and develop. Paralleling this cognitive

growth is the physical growth that occurs as humans mature. Piaget (1973), Kohlberg (1973), and Kolb (1984) observed human development from both a cognitive and a physical perspective, as well as through the lens of learning processes. Understanding how development and learning processes intersect in human growth is critical to the comprehension of learning styles theory, given that these two processes are foundational to the formation and shaping of learning styles. Following is a discussion on Piaget's, Kohlberg's, and Kolb's perspectives regarding human development and learning.

Piaget (1973) classified and organized human cognitive development into four stages: 1) sensorimotor, 0-2 years, 2) preoperational, 2-7 years, 3) concrete, 7-15 years, and 4) formal operations, 16-20 years. Piaget's research focused primarily on the earlier stages of human cognition in relation to maturational development, with minimal information provided about the fourth stage that extended into early adulthood. The lack of information about the fourth stage with respect to adult cognition and learning revealed a critical gap in Piaget's knowledge regarding adult learning processes. Nonetheless, Piaget's seminal work in human cognitive stages fundamentally opened the discussion about adult learning processes and what they entailed. According to Piaget, his fourth stage of cognitive development that was focused on the learning of formal operations began in the senior high school years and extended into early adulthood. In this stage, skills in logic that were applied to abstract ideas were expected of the learner. Piaget believed that after early adulthood, adult learners did not undergo any specific cognitive developmental changes during the remaining years of their lifetime (Kohlberg, 1973, p. 9). While Piaget identified his fourth stage as one that involved adult cognitive development, his details regarding adult development beyond the adolescent and early

adulthood timeframes were limited, with many questions unanswered about the complexities of this stage. Despite this lack of information on the fourth stage of human cognition, Piaget's first three stages are considered the stages where individual learning processes and learning styles are fundamentally formulated and shaped. These learning processes and styles are subsequently perfected and then advanced to the adult cognitive development stage. As such, university educators as learners undergo these human cognitive developmental changes as first learners and carry these learning preferences and styles into their learning and teaching practices (pp. 36-37).

In response to Piaget's (1973) human developmental stages, Kohlberg (1973) published his article "Continuities in Childhood and Adult Moral Development Revisited" that explored the "existence of developmental stages in adulthood" (p. 1). Kohlberg argued that the biological stages of human development maturation were not the only methods of determining whether development changes occurred in late adulthood. For a new adult stage to exist, Kohlberg explained that experiential factors in learning would need to be present and recognized within this stage. However, Kohlberg believed that there was a discrepancy in the time and pacing between this new adult stage of cognitive development and the final physical development stage of humans. In other words, humans completed their physical maturation levels in early adulthood, but cognitive development and learning was significantly delayed behind this final stage of physical maturation (Piaget, 1973, p. 36). "The actual appearance of the cognitive stage may lag way behind the maturational change, or may never occur because of experiential factors" (Kohlberg, 1973, p. 10). Kohlberg suggested that experience in learning was crucial to the learners advancing from Piaget's fourth stage of human development to the

new adult stage where cognitive maturity through moral development occurred. In relation to adult learning and learning styles, it is Kohlberg's moral development stage that supported the maturity and strengthening of learning styles, especially when university educators transition between the roles of learners and teachers.

Further examination of the human development and learning processes continued with Kolb (1984). Drawing from a combination of Jung's ([1921] 1971) personality types, Piaget's (1973, p. 36) human developmental stages, and Kohlberg's (1973, p. 9) moral development theory, Kolb originated his experiential learning theory of growth and development (p. 141). His theory articulated the connections between human development and experience. Upon analyzing Vygotsky's (1978) concept of the "zone of proximal development where he believed learning occurred" (p. 133), Kolb intuitively recognized that Vygotsky's zone of learning was a place or time where both learners and educators could demonstrate and apply learning processes at many levels. Application of learning styles is one of these learning processes, given that Vygotsky's zone is fundamentally the structure of a lesson.

Kolb (1984) differed from Piaget (1973) in that his ELT included three developmental stages that began at infancy and extended to late adult years, whereas Piaget outlined four stages that ended in the early adult years. Kolb identified learning experiences as the key action for advancing from one stage to the other. This was also supported by Vygotsky's (1978) argument that learning preceded physical maturation development. Kolb's theory recognized that there was significant cognitive growth in the adulthood stage because of the impact that experience had on growth. While biologic maturation was an important measurement of cognitive growth in the earlier years of life,

as Piaget's theory centered on, Kolb structured his theory to focus on the understanding that experience occurs at all levels and throughout all stages of life. In other words, experiences did not stop at the adolescent or early adulthood stage, but rather continued throughout a life time (pp. 140-141).

The research that Piaget (1973), Kohlberg (1973), and Kolb (1984) conducted in the area of human development and learning processes changed how learning is currently understood. Each theorist applied critical information from the previous theorist which demonstrated their respect for each other's ability to advance the knowledge base of these processes. Given that Kolb's learning styles are integrated within this current study, his work supported the scope of this research.

Educational perspectives. One of the main purposes of the discipline of education is to understand the learning processes inherent within humans. One of these processes involves the study and comprehension of learning processes in relation to learning styles. Seminal theorists who have fundamentally changed how learning is perceived include Durkheim (1956), Vygotsky (1978), and Kolb (1984). This section provides a detailed discussion with respect to the work that these theorists have completed in this area of research. Following this discussion is a discourse on the work of Kolb, which includes his experiential learning theory (ELT), its four learning modes and learning styles, and the Index of Learning Styles instrument. Kolb's research in learning processes and learning styles was foundational to this current study; and therefore warranted a detailed explanation outlining the interrelationships between his work and Jung's ([1921] 1971), between his work and research conducted by other theorists in the

area of learning styles, and between his theory and how it interconnects with this current study.

Vygotsky's learning zone. Vygotsky's (1978) underlying learning theory included two concepts: zone of proximal development, and more knowledge others. Both concepts were fundamentally connected that supported social learning between more knowledge others (educators) and learners. As such, if these two concepts were situated in a higher education environment, Vygotsky's zone represents the learning environment required for learners and university educators to share information. As well, within this learning zone structure, university educators as more knowledge others are positioned to exchange critical lesson content that affects the learning outcomes of the learners. This zone is also the learning space where university educators and students apply their learning styles when engaged in the delivery of lesson content. University educators are considered content experts in lesson delivery or as Vygotsky identified them as 'more knowledge others' (pp. 84-91).

Vygotsky's (1978) idea that human cognitive development was preceded by social learning was a significant discovery, especially since researchers prior to Vygotsky's work believed that human cognitive development was governed by the physical stages of human maturity. Piaget (1973) had already developed his human cognitive development stages that spanned the ages of zero to early adult years. Vygotsky (1978), however, disagreed with one aspect of Piaget's theory. Through his observation and research, Vygotsky recognized a significant difference in children's cognitive development when mentored by an adult who assisted them in their learning. Vygotsky believed that when children were engaged in a one-on-one social learning situation with

someone who was more knowledgeable then they were, the children were immersed in a state of transitional learning where they acquired, explored, and accepted or rejected new knowledge. One of the critical stakeholders in this learning situation was the educator or more knowledge other (pp. 84-91).

The more knowledge other (MKO) was characterized by Vygotsky (1978) as an adult who guided the learner (p. 86). This role was critical to the success of how his zone of proximal development functioned. This role was seen as building the foundational scaffolding to ensure that effective learning occurred within the learning environment which was structured around a lesson format. Within this lesson format, the educator or more knowledge other was able to support the learner by applying instructional and learning techniques within the content of the lesson. In relation to this current study, the structure of a lesson was paramount to the structure of the inventory that was used to capture data as both were based on the premise that lessons are a containable set of activities. In the case of this study, these activities included the development, delivery, and debriefing of a lesson. Hence, Vygotsky's theory and structure of his learning zone supported the current study's intentional application of lesson structure.

*Kolb's learning styles research.*Through his wisdom and knowledge regarding learning processes, Kolb (1984) insightfully understood the importance of integrating human functions and learning processes within the context of real life situations. This partnering of knowledge acquisition and experience obtained in learning environments established the basis for his his experiential learning theory (ELT). Kolb also comprehended the critical relationship that existed between facts and experiences, and the importance of this connection was articulated in his four-mode learning cycle (p. 141).

The ELT provided and articulated a more holistic vision of how experience was a substantial and core component of the learning process. Structurally, the ELT presented three human cognitive development stages that were formed, shaped, and based on Kolb's four foundational learning styles.

The basic construct of Kolb's (1984) four-stage cycle was represented as an inverted cone, the base representing the lower stages of development and the apex the highest stage of development (p. 141). Situated at the foundation of this cone were the four adaptive learning modes which comprised "concrete experience, reflective observation, abstract conceptualization, and active experimentation" (p. 40), and which were combined to form the four learning styles of convergent, divergent, assimilating, and accommodative. Progressively moving through the three development stages of acquisition, specialization, and integration to the apex of the cone, the four learning modes "became more highly integrated at higher stages of development" (p. 140). Each of the four complexities (behavioral, symbolic, affective, and perceptual) supported and promoted higher-order skills within the learner. Behavioral complexity allowed the learner to be engaged in active experimentation in higher-order actions. Abstract concepts formed the basis for higher-order concepts in the symbolic complexity. Affective complexity enabled the learner to experience higher-order beliefs. Reflective thinking was the focus of the perceptual complexity where the learner relied on observation as the critical information gathering process (pp. 140-141). As these complexities were integrated within the learning modes, they were highly adaptive in structure and composition, which provided comprehensive flexibility for the learner. These adaptive modes were simultaneously integrated into the four learning styles.

Kolb's (1984) his experiential learning theory (ELT) model comprised three broad human *development stages*: acquisition, specialization, and integration. Kolb described the acquisition development stage as spanning between birth and adolescence. In this stage, the learner moved from existing as a social and external individual to developing into a person who possessed a deeper level of self-awareness at the emotional, physical, and mental levels. Identity confirmation was achieved through the evolution of internal and external conditions, events, and environments. Stabilization of the individual's identity enabled him or her to progress to the specialization stage which involved the specialization of attributes, skills, and abilities through academic and experiential learning situations that were higher in complexity than what was achieved in the acquisition stage. Competences in a specific discipline of study or skill were honed and applied resulting in a specialized knowledge base. This stage extended into early adulthood where learners completed post-secondary education or specialized training for professions or careers. In the third stage of integration, cognitive development required a learner to integrate his or her experiences, knowledge, and information into a cohesive and comprehensible form. A shift occurred when the learner's focus was directed away from the meeting of societal demands prevalent within the specialization stage to the reflective processes that were synonymous with higher-order critical thinking (pp. 141-145).

Kolb (1984) observed that in the early stages of life, a learner began to develop learning styles based on experiences and individual choices. As the learner matured and moved to the next human development stage, the four learning styles would begin to integrate into a more streamlined approach to learning. Kolb also understood the

relationship between learning and consciousness. A description of these processes

follows.

Kolb (1984) identified *four learning modes* that combined into pairs which

formed the *four learning styles*: convergent, divergent, assimilation, and accommodative

(pp. 77-78). Each style was distinct in its pairing of modes. The *convergent* learning style

combined the learning modes of "abstract conceptualization (AC) and active

experimentation (AE)," using creative problem-solving techniques to find solutions

during daily decision making, with a focus on the details of tasks and problems rather

than on people. With respect to university educators, the convergent learning style can be

used when they are making decisions at all levels within the instructional framework of a

lesson (development, delivery, and debriefing). Selecting lesson materials during

development, determining which methods and techniques should be used during delivery

of the lesson content, and reviewing the lesson after its completion to identify needed

changes for lesson improvement and quality characterize the activities inherent within the

lesson framework. These decisions culminate in a collection of instructional design and

teaching strategies that are facilitated within and external to the classroom learning

environment. Through the lens of the university educator's role, the outcomes of these

decisions are transitioned from lesson content design to lesson content delivery, and

finally to the stage of review. It is this lens or perspective that the university educator

uses as a filter when engaged in the development, delivery, and debriefing of a lesson. It

is also this lens that is influenced by learning styles. With respect to the *divergent*

learning style, "concrete experience (CE) and reflective observation (RO)" were the two

learning modes that combined to form this style. Efficiency and effectiveness were the

key focusses of this style, with the learner requiring a broader perspective about an idea or concept. In relation to university educators, the inclusion of tactile learning experiences such as experiments in labs that are supported by theory and observations that can be generalized into emerging themes or concepts are examples of how the divergent learning style can be articulated through an educator's role (pp. 77-78).

Assimilation and accommodative learning styles completed Kolb's (1984) four styles. By combining "abstract conceptualization (AC) and reflective observation (RO) learning modes," the *assimilation* learning style focused on the holistic approach to ideas and concepts by extracting pieces of information from various and numerous resources and then assembling them into a cohesive thought or image (p. 78). In the case of university educators, presenting a concept or idea to learners requires carefully selecting learning materials that are then integrated into an organized and consistent thought. This critical information is then presented to students in accessible units for integration into their learning cognitions. Writing in class, debating in competitions, and engaging in deeper discussions that form part of a collaborative assessment of a critical philosophy or theory are examples of how university educators use the assimilation learning style. The *accommodative* learning style combined the "concrete experience (CE) and active experimentation (AE)" learning modes in order to understand the relationships between things and people, viewing people as a key asset to learning (p. 78). University educators use this learning style when teaching historical and political events that are described through core individuals who participated in these events.

Hence, the instructional framework of a lesson (development, delivery, and debriefing) provides numerous and various opportunities for university educators to

discuss and understand relationships between individuals, things, and concepts. Kolb (1984) explained that a key aspect of his theory was the integration of the four learning styles as learners progressed through the three developmental stages, recognizing that learners applied their individual learning style preferences as they moved through these stages (pp. 64-65). The learning cycle that Kolb depicted in the illustration of his model explained that individuals entered the cycle when and where appropriately needed based on the type and nature of the experience. As they experience teaching and learning, university educators also present a preference to a learning style that can affect the way that they develop lesson materials, deliver lessons, and reflect on these lesson activities.

Using these four elemental learning modes, Kolb (1984) examined the relationship these modes had with the concept of *consciousness*, as well as investigated how learning shaped the way humans cognate. Using the two developmental areas of differentiation and integration, Kolb determined that the elementary forms of the learning modes supported the basic differentiation thinking skills, and the combination of these elementary forms represented the higher-order thinking skills. "The conscious focus of experience that is selected and shaped by one's actual developmental level is refined and differentiated in the zone of proximal development by grasping and transforming it" (p. 146). Kolb also developed three processes that furthered the connection of the conscious and the learning modes. He identified registrative, interpretative, and integrative as processes where the learner used his or her consciousness in deciding how to approach a learning task. Kolb argued that consciousness began by registering the experience, selectively gathering information and organizing it for further application. Consciousness then advanced to the interpretative level, assisting the learner in transforming this

information by using the affective, perceptual, symbolic, and behavioral complexities.

This second level was critical to the learner because a decision about which experience

should be attended to was paramount to what specialization the learner chose to focus on.

If the experience was positive, then the learner would most likely repeat this learning,

building upon a repertoire of knowledge and experiences. At the third level of

consciousness, integration synthetically transformed this same information by using

purpose, focus, and scope (Kolb, 1984, p. 150).

Kolb (1984) argued that learners decided on which combination of learning forms

they wanted to apply, based on the learning task they needed to complete. For example,

Kolb explained that when the learner combined the two elementary learning forms of

convergence and accommodation, the result was "an increase in behavioral integrative

complexity via the resolution of the dialectic between comprehension and apprehension"

(p. 148). He described the situation of how a learner made specific decisions while

playing the game of pool. The learner used a convergent problem-solving approach that

assisted him or her in acting accommodatingly to the situation, while keeping in mind the

achievable goal of sinking all the balls into the pockets. The learner was guided by the

experiences each pool shot provided, allowing for opportunities in consciously selecting

which learning form would be appropriate for the next task to be completed. This

approach demonstrated the adaptive processes inherent within a learning event.

Comprehending the complexity of Kolb's (1984) ELT model is an important first

step to understanding how experiential learning affects learning styles and teaching.

However, it was long term examination of a theory through peer-reviewed rigor and

application that determined Kolb`s ELT with respect to its validity, credibility, and acceptability within the research community.

Kolb's current research. More than thirty years have evolved since Kolb (1984) introduced his his experiential learning theory (ELT) model. Numerous researchers have applied his model in traditional and non-traditional (online) learning environments resulting in various outcomes. Kolb and Kolb (2005) identified 1728 studies that have used ELT to increase the knowledge base of experiential learning (p. 8).

Also, Kolb and Kolb (2012) have developed the Kolb Learning Styles Inventory version 4.0 in collaboration with the Hay Group Consulting Firm. Version 4.0 moves from four learning style types to nine learning style types (initiating, experiencing, imagining, reflecting, analyzing, thinking, deciding, acting, and balancing) and assesses learning flexibility, which is the "ability to adapt to the demands of different learning situations" (Hay Group, 2011, paras. 3-4).

Research in support of the KLSI Version 4.0 has demonstrated that there were five new learning styles that could be included with the ELT original four, assimilating, converging, accommodating, and diverging (Mainemelis, Boyatzis & Kolb, 2002). In addition to these four styles, Mainemelis, Boyatzis, and Kolb (2002) identified *balancing* as the fifth new learning style which integrates the four learning modes of abstract/conceptualization, concrete experience, active experimentation, and reflective observation within this one learning style. As such, learners who were balanced in their learning preferences were highly flexible and adaptable to their learning environments. The addition of this learning style supported the understanding that the original four

learning styles needed to be seen as continuous processes rather than quadrants on a grid (p. 9).

As well, in their article on the "Educator Role Profile" Kolb, Kolb, Passarelli, and Sharma (2014) focused on the process of becoming an experiental educator which included "a dynamic matching model for teaching around the learning cycle describing four roles that educators can adopt to do so—facilitator, subject, expert, standard-setter/evaluator and coach" (p. 204). In their study, they provided a model that included these four educator roles in relation to their Nine Style Learning Cycle (p. 228). Educator roles, learning styles, and instructional techniques were explained and described within the context of this dynamic matching model which demonstrated the relationship between the role preferences of educators and students' learning styles. Kolb et al. reiterated that adaptation was critical to the success of both the educator and the learner when engaged in learning situations (p. 229). This description of learning can be compared to Vygotsky's (1978) *zone of proximal development*, where both educator and learner work collaboratively to support learning—the educator choosing to adapt one or more educator roles and the learner choosing to adapt leanring style preferences to the learning enivronment. Their research provided important information and insights into the understanding that "educators do tend to teach the way they learn" (p. 228). This supports the focus of this current study in that educator's apply their learning styles when developing, delivering, and debriefing a lesson. Essentially, instructional choices are driven by educators' learning styles application.

Kolb and Kolb (2005) also addressed the issue as to whether learning styles were "temporally stable" as questioned by Robotham (1999). They argued that the ELT model

was not solely based on fixed genetic characteristics or environments, but recognized that learners *established their own patterns of learning* through an integration of daily interactions of external observations and internal reflections. In other words, each learner expressed his or her individual learning preferences through a constant pattern of these transactions, creating a flexible yet stable configuration of their learning styles. While basic stability in the learning styles was established through the integration of Jung's ([1921] 1971) four core human personality functions (thinking, feeling, intuiting, and sensing), Kolb and Kolb stated that these foundational functions were also flexibly adapted by learners during learning situations. In response to Robotham's critique, Kolb and Kolb altered the names of the learning styles to divergent, assimilation, convergent, and accommodative. This renaming was implemented so that researchers, educators, and learners focused on the learning style rather than the individual (p. 16).

   Other theorists and Kolb's research. Kolb's (1984) research in the area of learning processes and learning styles has been utilized by numerous researchers in various learning environments and situations. The following provides a description of some of the methods and approaches in which Kolb's work has been applied, as well as approaches used to measure learning styles.

   Robotham (1999) conducted a review of various researchers who had developed theories or instruments that measure learning styles. He created two categorical lists: high quality learning style where the focus was on the learning process, and low quality learning style where task completion was the aim. He also reviewed the learning style instruments to help determine whether student learning styles and instructional styles should be matched or mismatched to improve learning. He organized the researchers into

two groups: those who believed that instructional and learning styles should be matched, and those who believed that they should be mismatched. In his review, Robotham determined that there was considerable debate regarding the matching or mismatching of instructional and learning styles. He discovered that many studies conducted in this research area used small samples and often did not include a control group. He also argued that categorizing students into a learning style was a flawed approach to learning, and that it did not "consider the development of foundation skills, such as self-directed learning" (p. 10). Robotham suggested that a longitudinal study that included a large sample and a control group would help identify whether or not learning styles were temporally stable. Robotham described Kolb's (1984) theory as advocating both a matched and mismatched teaching/learning style, depending on the learning situation. Robotham believed that learning styles were not temporally stable, and suggested that empirical research needed to be conducted to determine whether this was true or not. While this is an important issue to consider, Robotham did not offer to conduct any research himself to respond to this consideration, leaving his own critique unsubstantiated.

Cano-Garcia and Hughes (2000) conducted research to answer two central questions: "Is there any relationship between learning and thinking styles? [and] Can the students' academic achievement be predicted by the styles? And if this is possible, what are the best predictors?" Two hundred and twenty students from a state university in the south-west of Spain participated in this study. The Learning Styles Questionnaire which was adapted from Kolb's (1984) Learning Style Inventory and the MSG Thinking Styles Inventory (Sternberg & Wagner, 1991) were used to capture data about the connection

between learning and thinking styles of adult learners. Students were asked to complete these two instruments during one classroom hour. The data supported the expected relationship between learning and thinking styles. The results also indicated that only certain styles predicted academic achievement. This also indicated the need for students to adapt their learning and thinking styles to meet the demands of their specific studies. However, this study did not focus on the need for university educators to also examine the use of their learning styles as they are adapted within the classroom environment and how they may influence student learning even before they enter into the classroom.

In a study by Koch et al. (2002), eight educational institutions participated in the Ohio Teaching Enhancement Program for Junior Faculty. This program had been implemented for over 20 years and had been highly successful. Fourteen faculty members who had 1 to 5 years teaching experience were asked to participate in a 1 year program that provided support for them through continuous assessment and feedback from an experienced faculty mentor and a student associate. Each faculty participant was asked to design specific teaching methods, student activities, and evaluation techniques that could be used in their classrooms. Detailed tracking and recording of this process of scholarly teaching resulted in the creation of a generic strategy that included activities such as reflection on teaching, best practices in the classroom, and assessment of environment specific student needs. Koch et al. also noted that this strategy for creating scholarly teaching had been applied to different and various classroom environments, which demonstrated its flexibility and adaptability. This strategy also evaluated "the impact on student learning" (p. 84). It focused on how dynamic the classroom was with constant change occurring in the course content, instructor approach, and student learning style.

Koch et al. provided excellent examples on how instructors and adult learners communicated within the learning environment. They also discussed the process of integration which is Kolb's (1984) third maturational development stage in his his experiential learning theory (ELT) model.

Logan and Thomas (2002) conducted research on distance education students' preferred learning styles at the Open University, U.K. Three instruments were used to measure these learning styles, including the Honey & Mumford Learning Styles Questionnaire (1995), Grasha-Reichmann Learning Styles General Class Form (1996), and Antonietti & Giorgetti's Questionnaire on Visual and Verbal cognitive style (1993). Participants of the study included sixty-six students who were registered in the university's computing course M206: An Object Orientated Approach. Student online behavior and study habits were remotely observed as they completed this course. Course delivery included text-based materials, computer conferencing, and televised broadcasts via the British Broadcasting Corporation. The Honey & Mumford Learning Style Questionnaire identified significant gender differences in learning style preferences. Females indicated a strong preference to the Pragmatist and Theorist learning preferences; whereas, males indicated a lesser preference towards these learning styles. Results of the Grasha-Reichmann Student Learning Styles Scales indicated no gender differences; however, there were strong preferences for the Collaborative and Independent styles. There were minimal differences recorded in the Questionnaire on Visual and Verbal cognitive style.

Brown (2003) examined how an educator's teaching styles affected student learning. She stated that teachers default to their preferred learning style when teaching

because they are most comfortable with what worked for them when they were new learners. Brown surveyed the literature to determine whether a matched or mismatched teacher/learner style worked best for learners. She stated the importance of focusing on student-centered learning rather than teacher-centered instruction. Brown supported this idea by citing Kolb's (1984) belief in the need for teachers to use instructional techniques and practices that meet the needs of all types of learning styles so that each learner finds a way to connect with the content being presented. While there are benefits to matching teaching and learning styles, Brown concluded that there are also benefits to diversity of teaching style to assist learners in developing their less preferred learning styles.

Felder and Brent (2005) conducted a review of learning style models to compare their approaches and applications in learning. Myers-Briggs (1962), and Kolb (1984) models were examined to see how these three models could measure student diversity in learning styles, study habits, and intellectual development. Felder and Brent discovered that the more effective the instrument is in collecting data, the clearer the data are for understanding student differences. Therefore, more research is required to refine and formulate the questions on instruments so that clearer data can be collected.

Hall and Moseley (2005) were commissioned by the Learning and Skills Research Centre in Britain to do a review and examination of the models of learning styles that have been developed. Thirteen models of learning styles were identified and organized into families. These models were placed on a line spectrum that grouped them into two categories. The first category was located left on the spectrum which included theorists who believed that genetics played a role in inherited traits, and that interaction affected personality and cognition. The second category was located right on the spectrum and

included theorists who focused on factors such as motivation, environment, and group or individual learning. The authors recognized the appeal that learning styles models contained, especially when an educator understood how this information could be used to improve a student's learning experience. Hall and Moseley created a set of criteria that was used to examine and compare these thirteen models: definition, underpinning beliefs, positive aids to pedagogy, self-awareness and metacognition, and drawbacks. The result was that a process to compare learning styles was created and could be further used in comparing future learning style models that may be developed.

Kolb and Kolb (2005) introduced the concept of *learning spaces* as a foundation for comprehending the connection between learning styles and educational environments. Three longitudinal studies were used to demonstrate the use of this learning space framework: Cleveland Institute of Art, Case Western Reserve University, and Case Weatherhead School of Management. Principles were defined, outlined, and presented for the purposes of assisting institutions in developing initiatives to implement the experiential learning model. In their discussion, Kolb and Kolb articulated the importance of designing and developing learning spaces that affected learners' abilities to apply their learning styles and adapt them to various and different learning situations.

Taylor (2006) focused on meaningful learning and examined what types of learning change what and how people know things. Taylor closely examined three teaching and learning theories: constructivism and experiential learning, narrative and writing, and non-veridical learning. Two additional theories were also examined which included transformational learning/reflection, and emotions in teaching. Taylor provided a detailed description of each theory by citing numerous researchers and comparing and

contrasting each author's approach to the specific theory. She then looked at how brain function could be accommodated by instructing the educator to apply specific teaching strategies so that the adult student could learn more effectively. For example, Taylor compared constructivism and experiential learning and used brain function and experience as key factors. Taylor stated that all of these teaching and learning strategies do change the brain, citing Cozolino's (2002) research on learning and neural networks, and how the integration of these two processes changed the physical brain. Taylor argued that being aware of these changes opens a learner's perception of his or her ability to adapt. Hence, Taylor's research assisted in bridging the connection between the physical brain, learning styles, and teaching techniques.

Ginns, Prosser, and Barrie (2007) undertook a significant study in measuring the validity and reliability regarding the student evaluation of the teaching instrument Student Course Experience Questionnaire (SCEQ). This instrument measured the "quality of the student experience" that focused on specific course subjects in specific years of study rather than entire degree programmes. A stratified random sampling of students (7632) from the University of Sydney was used to gather data using the SCEQ instrument (p. 607). It was determined that the SCEQ instrument was a valid and reliable instrument that accurately measured the perspectives of student experiences in undergraduate courses. These results would then be used in assisting various programs in making changes more quickly based on student feedback regarding learning and teaching practices. Acting upon this student feedback would allow current students to benefit from the changes before they completed their program rather than hear about them after they graduated. Ginns et al.'s research provided information about student learning and

teaching experiences that could be used to support the correlation between student and teacher communication practices. Some of the questions in the instrument asked students about how they interacted with teachers to improve their understanding of their course content. This is an important factor in understanding how teachers' learning styles and communication styles can potentially affect how they interact with students.

Smart and Umbach (2007) gathered their data from the Faculty Survey of Student Engagement (FSSE) which is used annually at the Indiana University Center for Postsecondary Research. This instrument assessed how faculty members created and designed their assignments so that students learned a wide range of skills and practices. Faculty approaches to teaching were also measured. Fifty faculty members who were at the level of assistant, associate, or full professor were included in the sample. Only four and five-year colleges and universities were included in the study. A MANOVA design was used to analyze the data. The two independent variables were Holland's academic environments and five levels of faculty members. Twelve measures that defined how faculty members designed their courses were the dependent variables. The results indicated that the five levels of faculty were similar in their interactions within Holland's (1966) four academic environments. The findings supported Holland's theory that these environments reinforced attitudes, skills, and behaviors that were specific to the discipline being taught. Therefore, faculty members structured their courses in order for students to learn these behaviors.

However, Kolb's (1984) experiential learning theory (ELT) and learning styles are only one of a number of learning style theories and models that could have been used within the scope and focus of this current research. Following is a synopsis of the critical

reviews on learning styles and theories that were conducted by other researchers in the fields of education and psychology. Also, this discussion provides a rationale for selecting Kolb's learning styles for this current study.

  Review of learning styles: The case for using Kolb's theory. Given the plethora of researchers who have presented theories, models, and instruments, understanding the various and numerous approaches and applications of learning styles is seminal to this study. Critical reviews conducted by Cassidy (2004), Coffield et al. (2004), Curry (1983), De Bello (1990), and Swanson (1995) on learning style theories, models, and instruments have provided crucial information and comprehension about the fundamental purposes and structures of learning styles. These critical reviews have applied different criteria and frameworks to measure the validity and reliability of these various learning style theories, models, and instruments. These critiques also provide knowledge and insights into the strengths and weaknesses of these various learning styles theories, models, and approaches. A description and summary of these reviews explain and articulate where Kolb's (1984) experiential learning theory, four learning styles, and Learning Styles Inventory (LSI) fit within the broader landscape of learning styles research, and provide a rationale for the use and application of Kolb's theory with respect to this study's research methodology and tradition.

  Curry (1983) reviewed 21 learning style models based on psychometric acceptability using the following criteria: "there had to be meaningful data collected, reported and described concerning validity and reliability of the measure proposed" (p. 7). Curry then developed the "Onion Model" which was an organizational structure that provided three layers used to categorize learning styles theories and models. Nine of

these 21 models met the psychometric acceptability criteria and were used by Curry to create three categories (layers): models of instructional preferences (outer layer), models of information processing style (middle layer), and models of cognitive personality (inner core; p. 9). The inner core included McCaulley's application of a cognitive personality measure which was based on the Myers-Briggs Type Indicator (MBTI; as cited in Curry, p. 10). This measure was also based on Jung's ([1921] 1971) two personality typologies (introversion and extroversion) and four personality functions (sensing, thinking, intuiting, and feeling). Curry proposed that the inner core learning style models that were centered on the measurement of the cognitive personality types established a foundational base for the middle and outer layers of the onion model. As such, when Curry's model moved from the inner core of cognitive personality models to the middle layer of models of information processing style, the understanding was that cognitive personality styles provided stability to this middle layer and that both the inner core and the middle layer provided stability to the outer layer of models of instructional preferences.

An example of this pattern of stability was demonstrated when Curry's (1983) onion model situated the MBTI instrument (as used by McCaulley) in the core layer. The MBTI was based on Jung's ([1921] 1971) cognitive personality functions. Curry then assigned Kolb's (1984) experiential learning theory and four learning styles to the middle layer which was also based on the fundamental functions of Jung's psychological types. Continuing through the spectrum of layers, Curry included Grasha-Reichmann's (1974) Student Learning Style Scales in the outer layer of the onion model (p. 20). This scale also derived from the foundational theory of Jung's psychological types and from Kolb's ELT model (Grasha, 2002, pp. 23, 45, 47). This progression of stability validated what

Curry explained and described in the onion model in relation to the staging and interrelationship that exists between its layers. This interconnectedness and stability between layers is also explained through Bertalanffy's (1968) concept and definition of an "open system" in which content is exchanged between internal and external environments creating a level of interdependence between the inner core of cognitive personality and the second layer of learner information processing, which is where Kolb's theory is situated. Bertalanffy described an open system as one that was balanced and that was sustained through the inter-exchange of content between environments through the basic premise of need (p. 48). Curry's onion model demonstrated this open system through its structure and theory.

Curry's (1983) onion model connotes the interrelationship between the layer and the evolvement of knowledge and learning construction, beginning with an individual's personality functions (inner core), moving to information processing (middle layer), and then externalizing this knowledge through concrete instructional preferences in learning (outer layer). Curry's onion model structure can also be superimposed onto the structure of the three main lesson activities: development, delivery, and debriefing. The development stage of a lesson relates to the inner core of the model where the educator can apply the fundamental personality functions of sensing, thinking, intuiting, and feeling to decisions regarding instructional content. The delivery of the lesson is represented in the middle layer of information processing, where educator and learner process the delivered instructional content. With respect to the outer layer of Curry's onion model, the process of debriefing a lesson corresponds with observing learning behaviors and reflecting upon the educator's and learner's instructional preferences that

were displayed during the middle layer of lesson delivery. The interrelationship between the development, delivery, and debriefing of a lesson is complex and requires deeper comprehension regarding this relationship. How learning styles inform these three main activities (layers) of a lesson requires clarity and transparency in understanding this relationship. This current study sought to explore two aspects of this relationship: how educators apply their learning styles during the three main activities or layers of a lesson, and how their learning styles influence their conscious reflective instructional choices during these three main activities.

In 1990, De Bello conducted a comparison study on eleven major learning styles models with a focus on their variables, appropriate populations, validity of instrumentation, overlapping of the models, and the research behind them (p. 203). De Bello considered the concept of individual learners' preferences to be one of the most "vital developments in American education today" (p. 203). The eleven models were assessed based on Curry's (1983) psychometric analyses, Kirby's (1979) research on cognitive styles, learning styles, and transfer skill acquisition, various publications in the area of learning and teaching styles from St. John's University, N.Y., and De Bello's experiences and analysis with respect to learning styles. The eleven models were selected on the basis of history, influence, reflection of practitioner's ability to identify style, relation to concurrent issues in education, if it was research based, and how widely known it was in the field of learning styles. Kolb's (1984) Learning Style Inventory was included as one of the 11 selected by De Bello that met these criteria. Kolb's Learning Style Inventory (KLSI) was reported as having strong reliability with fair validity, and that "four different variations of Kolb's model [were] in use today" (p. 213). Regarding

two major and constant issues related to Kolb's instrument, De Bello concluded the following. First, the issue of whether educators should teach to learning styles remains under continuous debate, as additional research is continually being conducted to answer this question. Second, the issue as to whether educators possess the knowledge and training to observe and assess learning styles is also under debate, as instruments being administered require accuracy and proficiency in interpretation and assessment. What is noteworthy in De Bello's review is that Kolb's theory, model, and inventory were considered a critical example to be included in the eleven models that were selected for assessment. Again, Kolb's model remained one of the known and extensively used models for learning styles assessment. The response to the two issues that De Bello articulated will continue to remain under debate, with no known conclusion in the immediate or distant future. Given this ongoing discourse, this current study has based its research and theoretical approaches using what is currently available in the literature and not on speculation regarding future responses to these issues. Based on this approach, Kolb's theory was used as a foundational theory for this study.

Swanson (1995) also conducted a review of the literature concerning learning styles with a focus on their definitions, the framework for categorizing the assessment instruments, and the various research studies conducted among diverse groups at the post-secondary level of education which includes universities, colleges, and institutes. Kolb's (1984) model and learning styles were situated in the information processing model group, given its focus on internal learning processes. Swanson's review concluded that significant research indicates there is a relationship between learning styles and cultural diversity in higher education. Swanson also recommended that educators in

higher education study, observe, and reflect upon the characteristics and attributes that constitute an excellent professor, instructor, or lecturer who teaches at a university, college, or institute. Swanson also posed the question that the overall and dominant teaching style used within the United States was the lecture/notetaking format that was questionable in terms of meeting white middle class students, let alone students who were of diverse backgrounds, cultures, socioeconomic groups, and language bases (p. 15). Further to this, Swanson posited that many researchers argued that identifying learning differences for the purpose of promoting and sustaining meaningful educational experiences and that using this information responsibly was supported by research-based information on learning styles which provided evidence for applying this knowledge within the context of higher education (p. 13).

Similar to Swanson, Cassidy (2004) presented an overview of the theories, models, and measures within the research area of learning styles. In his review, Cassidy aimed "to bring together necessary components of the area in such a way as to allow for a broader appreciation of learning style and to inform regarding possible tools for measurement" (p. 419). Kolb's (1984) his experiential learning theory (ELT) and his Learning Styles Inventory (LSI) were included in the study as one of the theories and measures discussed within the overview. While Curry's (1983) review of learning styles models presented the LSI as psychometrically valid and reliable, Cassidy stated that the results regarding the use of the LSI presented varying outcomes, citing studies from Sims et al. (1986) who found low test-retest reliability statistics and Veres, Sims, and Locklear (1991) who reported exceptionally high test-retest reliability of 0.99 (as cited in Cassidy, 2004, p. 431). Despite this variability in the use of the LSI, Cassidy recognized that five

other measures were foundationally based on Kolb's LSI, including Gregorc's Style

Delineator that used a similar format of Kolb's Learning Styles Inventory. To counter the

variability of the Gregorc's measure, De Bello (1990) recommended "that observation

and interviews be used alongside the instrument to assist in the identification of learning

style and preferences" (as cited in Cassidy, 2004, p. 429). This statement recognized and

indicated the crucial importance of conducting interviews in conjunction with participants

completing Gregorc's measurement which was based on Kolb's LSI. De Bello suggested

that using a mixed methods approach would provide another level of validity and

reliability to Gregorc's instrument. In the case of this current study, interviews were part

of the data gathering process that accompanied the responses made by university

educators in the EICLS Inventory (Mazo, 2008) which was based on Kolb's ELT theory.

As well, in support of Cassidy`s suggestion to include interviews as part of the data

gathering process when examining learning styles, this current study used a mixed

methods research approach that employed a sequential explanatory design beginning with

a learning styles inventory and following with one-on-one in-depth interviews (Creswell,

2009, p. 211; Teddlie & Tashakkori, 2009, pp. 153-154).

  The second measure Cassidy (2004) identified that used Kolb's (1984) his

experiential learning theory (ELT) and Learning Styles Inventory (LSI) as its basis was

Honey and Mumford's Learning Styles Questionnaire (LSQ; 1992) which was designed

for use in the industry and management sectors. The LSQ was developed for industry

specific use, and has been used in education situations with marginal success with the

conclusion that it was not an alternative to the LSI for use in higher education (Duff &

Duffy, 2002, as cited in Cassidy, 2004, p. 432). The third measure Cassidy identified as

being influenced by Kolb's theory and inventory was Vermunt's (1994) Learning Styles

Inventory which was also based on four learning styles but also comprised "20 subscales

and 120 items related to study strategies, motives and mental models" (as cited in

Cassidy, 2004, p. 433). Vermunt's measurement was designed to be applied specifically

for higher education use, the same learning context and environment in which this current

study was situated. The additional two measures affected by Kolb's theory and inventory

included the Embedded Figures Test (EFT) and the Matching Familiar Figures Test

(MFFT) which measure for convergent-divergent styles, two learning style dimensions

that are part of Kolb's four learning styles (p. 426). It is evident that Kolb's his

experiential learning theory (ELT) and Learning Styles Inventory (LSI) have influenced

and assisted in defining and shaping other measurements in the learning style area of

research. Despite the significant discussion surrounding Kolb's work, researchers have

continued to apply the theory and to use the inventory to develop new theories, to expand

on the learning style knowledge base, and to test the application of learning styles in

numerous and various learning environments. This continued range and variance of use

regarding Kolb's work has provided evidence that supported my decision to use Kolb's

ELT and learning styles for this current study.

Paralleling Cassidy's (2004) work on reviewing learning styles theories, models,

and instruments, was Coffield et al.'s (2004) study that aimed "to carry out an extensive

review of research on post-16 learning styles, to evaluate the main models of learning

styles, and to discuss the implications of learning styles for post-16 teaching and

learning" (p. 3). They addressed four critical areas regarding learning styles: what models

were influential, what evidence existed of their statements; what implications were

present; and what impact was evident on student learning (p. 3). Coffield et al. selected

and categorized the learning style models within five groupings, with Kolb's (1984) his

experiential learning theory (ELT) and learning style instrument being situated in the

"flexibly stable learning preferences" group, which also included the models of Allinson

and Hayes, Herrmann, and Honey and Mumford (p. 11). When reviewing Kolb's work,

Coffield et al. presented various research studies that supported Kolb's theory (ELT) and

inventory (as cited in Coffield et al., 2004; Buch & Bartley, 2002; Katz, 1990; McNeil &

Dwyer, 1999; Sein & Robey, 1991; Sugerman, 1985) and those that did not (as cited in

Coffield et al., 2004, Garner, 2000; Wierstra & de Jong, 2002). The study concluded that

Kolb's work had spawned considerable discussion regarding learning styles research, but

also stated that the theory and the inventory were two different aspects of Kolb's research

and that they should be assessed separately to obtain an accurate understanding of each

one. Coffield et al. also concluded that there are too many expectations regarding "a

relatively simple test which consists of nine or 12 (1985 and 1999) sets of four words to

choose from. What is indisputable is that such simplicity has generated complexity,

controversy and an enduring and frustrating lack of clarity" (p. 69). Despite the various

discussions and deliberations on Kolb's work, there is clear evidence that it has withstood

rigorous dialogue and discussions over an extended period of time (30 + years) and that it

has remained and is considered one of the influential learning style theories and models

within the field. The fact that several more current learning style models and instruments

are premised from Kolb's research is testimony to the validity and credibility of his

theory. As such, it is not incumbent upon this current study to determine the absolute

validity and credibility of Kolb's research; as currently, there is no one authority to

determine this decision, and this discussion is ongoing. Hence, this study applied Kolb's ELT theory because of the value that it brings to the nature of this study which is the descriptions of the four learning modes and styles that are provided within his theory, and because integrated within these styles are Jung's ([1921] 1971) four core human personality functions that support the foundation of the four learning styles.

Conscious Reflections: Conceptual Frameworks

Reflection in learning is foundational to the teaching and learning processes that occur in a higher education environment. When applied by university educators while engaged in their instructional design and teaching practices, reflection supports the higher learning skills of critical thinking and deep reflection in both educators and students. While there are theorists who have provided perspectives on the relationship between reflection and higher education, the research conducted by Brookfield (1995) and Fiddler and Marienau (2008) have had a focus on educators and their role within this relationship. Their work informed this current study through the research they have completed in the area of reflection as it supports both the teaching and learning roles of educators in higher education. Fiddler and Marienau's events model of learning from experience (p. 82) directly supported the qualitative data gathering process which is Part II: Interview of this study and which was presented in the form of in-depth interviews. Additionally, Lyons' (Ed.; 2010) recent work in the area of reflection and reflective inquiry was examined as a current resource for this study, given it investigated reflection within the context of teaching and learning from educators' perspectives.

Brookfield (1995) focused on critical reflection, one aspect of the overall process of reflection. The substance or content of this approach was represented in the detailed

description and application of critical reflection. More specifically, Brookfield concentrated on the need for teachers to adopt critical reflection in their teaching practices. With respect to form, the critical reflection process was illustrated through a diagram that depicted its sub-processes and interrelationships. Positioned at the center of this diagram was the concept of "assumptions" that was surrounded by three types: causal, prescriptive, and paradigmatic. Imposed on these types of assumptions were the concepts of "power" and "hegemony" which were visually represented as two overlapping ovals. At each corner of the diagram, four lenses were included from which teachers could use to view their teaching approaches and to reflect upon their perspectives: autobiography, students, colleagues, and theory (p. 30). Within this critical reflection process, Brookfield also identified two types of reflective practices: non-critical and critical. While this was an important aspect to consider for this current study, it was Fiddler and Marienau`s (2008) perspectives on community based learning that identified the relationship between learning, teaching, reflection, and meaning.

Fiddler and Marienau (2008) examined community based learning and education through two perspectives: "engagement with service to the community," and "learning and associated processes" (p. 75). In their discussion, reflection was described as the act of inquiry into an experience which was subsequently used to attach and establish meaning to a learning situation. They provided a comprehensive list of the elements of inquiry and the aspects of reflection and reflective practices, in relation to meaningful learning. To further illustrate the connection between experience, meaningful learning, and reflection, Fiddler and Marienau developed the events model of learning from

experience which distinguished between "an event in one's life and one's experience of it" (p. 83).

As well, Fiddler and Marienau (2008) focused on community based learning and how the process of reflection informed this approach. They believed that reflection bridged the gap between "experience and learning" (p. 76). Creating a comprehensive list of elements that identified the characteristics of reflection and reflective practices, Fiddler and Marienau recognized important attributes that were identifiable when inquiring into experience such as active participation, initiation of an unusual event, examination of one's beliefs, and integration of a new understanding of one's experiences (p. 79). In addition, they provided critical aspects of reflection including posing the important question of: "What's getting my attention?," focusing on what is salient to the learner, identifying what the learning possibilities are for the learner regarding an experience, discovering how the learner's ideas compare with others, and determining where this knowledge leads the learner when establishing connections with old and new information (p. 79). Their events model of learning from experience further illustrated the importance of reflection in learning, providing clear relationships between events, experiences, and the act of reflection as it is used by learners to develop meaning through various dimensions including significance, beliefs, emotions, connections, and actions (p. 82). When combining their list of elements and their model, Fiddler and Marienau provided a comprehensive understanding of how reflection needs to be revisited and reconsidered regarding its definition, understanding, and application in both education and community environments.

Lyons' (2010) current research on reflection in the teaching profession provided critical insights into the application and implementation of reflection within higher education. This also supported Fiddler and Marienau's (2008) position that the fundamental understanding and use of reflection required re-visitation and review. More specifically, Lyons presented a case study about engaging in inquiry that explored teaching and learning practices and processes and posed the following question: "What if teachers or any practitioner were to study regularly and seriously their own and their students' contexts of learning?" (p. 30). In order to accomplish this task, Lyons stated that reflective inquiry would be required and would need to be consistently used by teachers to achieve a state of deep cognitive understanding about a problem, issue, or concern within their teaching practices. Additionally, Lyons described the process of inquiry as one that was meta-cognitive in nature which required observing, contemplating, and recording a teacher's thinking and knowing processes (p. 31). Documenting these processes were valuable to comprehending how teachers approached their teaching practices, what skills were required to be successful at reflective inquiry, and how this knowledge would be useful to teachers. Lyons also identified the critical importance of recognizing the meaning that supports reflection in teaching (p. 31), as this was transformational in its outcome. Based on this information, it can be postulated that a start point of reflective inquiry can begin with an educator's reflection on his or her own teaching and learning practices, which are subsequently reflected within the context of the classroom. As such, an educator's reflection process can derive from various frameworks within teaching practices. One such framework can be found within the structure of a lesson and how an educator reflects on the processes inherent within this

structure. In relation to this current study, the framework of a lesson included the three main activities of development, delivery, and debriefing and focused on the educator's reflections with respect to this framework.

Summary

Chapter 2 provided a comprehension review of the existing literature with respect to instructional approaches, learning processes, learning styles, and reflection in higher education. Detailed descriptions and explanations of the seminal and current theorists who have conducted research in these areas have been presented in support of this current study. Clarity with respect to the relationship between these theorists and the intent of this current study has also been provided. What is known about learning development, processes, and styles is extensive (Cassidy, 2006; Coffield et al., 2004; Curry, 1983; De Bello, 1990; Grasha, 2002; Jung [1921]1971; Kohlberg, 1973; Kolb, 1984; Piaget, 1973; Swanson, 1995). What is also known is the significant research that has been conducted in the areas of instructional design (Bloom, 1956; Gagné, 1985; Reigeluth, 1978), as well as the substantial research being conducted in the areas of reflection and learning (Brookfield, 1995; Fiddler & Marienau, 2008). However, what was not known was whether learning styles of university educators' influenced the instructional choices they made within the framework of a lesson (development, delivery, and debriefing).

Chapter 3: Research Method provides information on the population, sample, data collection instruments, as well as the data collection and data analysis plans.

Chapter 3: Research Method

Introduction

The purpose of this mixed methods sequential explanatory strategy (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154) and design was to explain the association between university educators' reflective instructional choices made within the instructional framework of a lesson (development, delivery, and debriefing) and their learning styles. Chapter 3 outlines the research method, delineating the setting, design and approach, researcher role, methodology, threats to validity, and issues of trustworthiness. Data collection and analysis, instrumentation and materials, protection of human participants, and dissemination of findings are also defined.

The selection of the mixed methods research tradition is explained, including a description of the design and approach of this method as well as an explication of the rationale for choosing this method, which is further defined within its paradigm and tradition. Definition and description of the population and sample are presented, providing transparency with respect to the research participants, their role within the study, and the selection criteria. A justification for selecting the data collection process ensues, establishing further rationale for the approach that was used to gather critical information for the purposes of the study. My role as the researcher is depicted, providing clarity and comprehension concerning my function and responsibility within the context and structure of the study. Factors relevant to selecting the research methodology are discussed, including accessibility of the study, geographical location, and time constraints. In conclusion, justification is provided for ensuring that ethical standards

were foundational to the study and that they remained one of the underlying tenets and

rules that supported the research.

Setting

Historically, the concept of a *setting* for a research study has been described as a

physical space, concretized through detailed depictions of the environment in which

participants are situated. With the advent of computer technology and the Internet, the

theory of *physical space* has been significantly revisited, re-evaluated, re-examined, and

retested with respect to its definition. A physical setting is only one application of the

theory of *space*. Setting in relation to the Internet disrupts the notion of what the

boundaries of physical space constitute. Further, the concept of a *space* as described by

Habermas (1992) indicates that the perception and nature of a *space* has been redefined

with respect to its boundaries and has moved from one that has physical characteristics to

one that offers a plethora of choices such as the Internet, web conferencing, and other

media used to reach various populations (pp. 421-461).

These Internet space boundaries extend across international borders, reach into

the mosaic of cultures, redefine traditional age groupings, shape perceptions of genders,

and reveal the layers and realities of socioeconomic conditions. This re-visitation of the

concept of what *setting* comprises related to this study. The notion that a setting can only

be physical in nature has changed exponentially. Internet technology supports various and

many subtechnologies and applications that provide numerous methods of gathering data,

including online databases and web conferencing. It was these specific technologies that

allowed me to engage in collecting data from participants who lived in the United States

and Canada and were university educators. Additionally, these technologies enabled me

to conduct in-depth interviews via web conferencing with participants in the United

States and Canada. In-person interviews were also used as a method of gathering

qualitative data when possible.

Setting dictated where the study was conducted and who was eligible to

participate. Given that the population was derived from the United States and Canada, the

physical settings for the study varied considerably. As such, the use of Internet

technology provided the participants and myself with the flexibility to access and

communicate information about the study, to facilitate the data gathering process, to

provide web conferencing for in-depth interviews, and to disseminate the results of the

study.

The setting for this research study was online and was accessible to all

participants who had access to a computer. This allowed for a broader representation of

gender, age, teaching experience, and teaching discipline within the data. Additionally, I

was available to conduct in-person interviews, which formed Part II: Interview

(qualitative). Two online locations that enabled participants to access the study. The first

location accessible to participants was the Walden University participant pool. Only

Walden University students and faculty had access to the study through this link. A

description of the research study and information on how to access and participate were

posted in the participant pool. The second location was situated within the International

Centre for Educators' Learning Styles (ICELS) website. All participants who were not

connected with Walden University accessed the study through this website. The EICLS

Inventory (Mazo, 2008), used to capture quantitative data, was housed on the ICELS

website and was made accessible to participants via an online link. The ICELS website

was developed by me for the purposes of providing information and conducting research regarding the relationship between an educator's role and the different styles that affect this role (teaching, learning, and communication). Qualitative research data collection (in-depth interviews) were conducted in an online setting using technology that supported web conferencing. During these interviews, participants had the opportunity to consciously reflect on their EICLS Inventory responses (Appendix D). The Internet provided the setting for all aspects of the study, providing flexibility and accessibility to all participants for 24 hours a day without any restrictions with respect to time zones. In-person interviews were also available to local participants when possible.

Observations About Settings

Two observations were noted regarding these settings. First, the Walden Participant Pool yielded few participants throughout the data gathering process. As such, the expectation that approximately half of the participants would derive from this population and online setting was not realized. While the reason was unclear as to why few participants engaged in the study through the Walden Participant Pool website, it was noted that this study did not provide course credit that could be applied to courses requiring a research component. This was a potential disadvantage of this study, given that there were many other studies that were posted in the Walden Participant Pool website offering credit toward course completion. Second, the use of the Walden Participant Pool by the student and faculty population indicated a general underutilization of the site to the extent that the number of participants expected to participate in Part I: Inventory was affected. As the Walden Participant Pool was identified as one of the main online locations of the study, the low number of participants who accessed the study

through this pool significantly affected the overall number of participants for the study. Participants who were external to Walden University were directed to the ICELS website for access to the EICLS Inventory (Mazo, 2008) online. This online site generated additional eligible participants, which increased the number of participants for the study ($n = 50$) overall. However, 38 participants out of 50 completed the inventory, thereby providing the data used for the purpose of this study.

However, with respect to Part II: Interview, it was observed that there was a barrier between some of the participants and the web conferencing technology used as the setting to conduct the interviews. One participant requested that the interview be conducted by telephone, and this request was accommodated. The idea of being interviewed in a virtual setting may have been received and perceived by some participants as new and may have affected their willingness to participate in Part II: Interview. This potential barrier, given that many of the participants were over the age of 40 years, suggested that they may not have been familiar with web conferencing technology. The description of the research study indicated that the interviews would be conducted using web conferencing technology that created a virtual setting, which may have deterred those participants with low technical ability. The purpose for using web conferencing technology as the interview setting was to provide flexibility in accessing participants who lived in the United States or Canada. Additionally, the web conferencing setting for interviewing was used to establish a level of accountability and authenticity that ensured the protection of the participant's identity. Considering these issues regarding the interview setting, seven participants consented to be interviewed. Four

interviews were conducted via web conferencing technology, two were conducted in person, and one was conducted by telephone.

Overall, the online access to Part I: Inventory and the web conference virtual setting for Part II: Interview accommodated those participants who were willing to participate in this study.

Research Design and Rationale

This study sought to address the following research question: How are the conscious reflective instructional choices that university educators make within the framework of a lesson (development, delivery, and debriefing) influenced by their learning styles? The central concept that was focused on was whether university educators' learning styles influenced the choices that they made when creating a lesson.

The current study was conducted within the mixed methods paradigm and used a sequential explanatory strategy and design (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). Mixed methods design systematically and holistically organize and combine the research traditions of quantitative and qualitative approaches. According to Creswell (2009), mixed methods sequential explanatory design "is characterized by the collection and analysis of quantitative data in a first phase of research followed by the collection and analysis of qualitative data in a second phase that builds on the results of the initial quantitative results" (p. 211). Given that the sequential explanatory design approach enabled me to confer dominance to one of the methods while subordinating the other, the study assigned dominance to the quantitative research method, with the qualitative research method being sequenced or second. Delegating priority to the quantitative method allowed me to initially gather data that recorded

university educators' conscious instructional choices, learning styles, and learning style usage patterns within the instructional framework of a lesson (development, delivery, and debriefing). Collecting data from the EICLS Inventory (Mazo, 2008) that was used for the study also provided a reasonable number of participants who were willing to participate in the qualitative research component involving an in-depth interview.

The intent of mixed methods design was to support triangulation, which underscored the rigor required to analyze the collected data and to extricate credible and valid findings. As such, enabling and implementing both quantitative and qualitative methods produced comprehensive information from which results and conclusions were drawn for this study.

The rationale and justification for using this design and approach were twofold. First, inclusion of all aspects of the study, such as data collection, design, sampling techniques, and findings, reduced the exclusion of information that was important. Second, research methodology and design demonstrated Bertalanffy's (1968) *open system* concept, which promotes the interchange, interrelationship, and collaboration of content that collectively, when calculated, advances the structure, information, and substance of a relationship that is being studied (p. 48).

Paradigm

This study was conducted to add needed-depth to the literature about the reflective instructional choices university educators made within the instructional framework of a lesson (development, delivery, and debriefing) and university educators' learning styles. In meeting this challenge, this study was conceived within the mixed methods research paradigm. Three distinguishing factors situated the mixed methods

paradigm for this current study: rigor was fundamentally established within the inherent structure, which provided two perspectives and methods rather than one; findings were authenticated through two research methods, providing breadth and depth of analyses; and deeper understandings of this complex relationship were achieved through the use of a mixed methods paradigm. As such, it was possible to comprehend in depth the patterns of use of learning styles within the context of lesson activities' organization and the complex and reflective choices that were made during these activities within the mixed methods research paradigm. By nature, human cognition and behavior is complex. The mixed methods paradigm reflected an understanding of this complexity, allowing for both statistics and narrative to work cohesively in making sense of the research question. The use of both paradigms created and established interdependency inherent within the holistic product of the study's results.

Given the enriched nature of the design, I was mindful and aware of the interexchange of information between quantitative and qualitative methods that constitute mixed methods. Careful, detailed attention was given when applying mixed methods, and adherence to the process was demonstrated when exploring the relationship between the conscious, reflective instructional choices that university educators made within the framework of a lesson (development, delivery, and debriefing) and university educators' learning styles.

Tradition

This study was conducted using the mixed methods research paradigm with the sequential explanatory design tradition (Creswell, 2009, p. 211; Teddlie & Tashakkori, 2009, pp. 153-154). According to Entwistle (1981), educational research methods

often rely on the interplay between large-scale surveys of students using

questionnaires and in-depth interviews with staff and students. The qualitative

analyses of interviews do not lead to measurable quantities, but they do provide

important insights into influences on learning. Those insights can then be used in

conjunction with the quantitative findings from surveys. (p. 5)

In support of this, Ballantyne et al. (1997) stated that while empirical and conventional

scientific traditions were successful in gathering specific data about targeted audiences,

these "tend[ed] to underplay the humanness of teaching" (p. xix). Additionally,

Ballantyne et al. (1997) and Entwistle (1981) stated that in applying both research

methods in studies, a collaborative approach to data gathering would support the concept

of triangulation of facts and would provide a deeper understanding of the construct being

examined. The sequential explanatory design tradition enabled the collection of initial

data through the quantitative research method in the form of the EICLS Inventory (Mazo,

2008). Once participants completed the inventory, they were asked to participate in a 1-

hour in-depth interview where they were provided with the opportunity to share their

conscious reflections on the instructional choices they made when they completed the

EICLS Inventory.

This cumulative evidence gathered from both quantitative and qualitative research

methods facilitated rich and thick knowledge about how the learning styles of university

educators influenced their conscious reflective instructional choices within the

framework of a lesson (development, delivery, and debriefing).

Role of the Researcher

My role as researcher involved two categories. First, I acted as the principal investigator of the study, articulating the purpose, scope, and meaning of the study's focus and intent. All aspects of this study were managed and organized by me in the role of researcher. Part I: Inventory was online and provided anonymity for the participants. I was responsible for gathering the data and acted as a contact for participants (via email) in the event that there were questions about the study. This email was used by participants to indicate their consent in participating in the qualitative part (Part II) of the study, which was a 1-hour in-depth interview that enabled them to express their reflections regarding their responses recorded in the EICLS Inventory (Mazo, 2008).

Second, I acted as interviewer during the qualitative data collection process of the study, which involved in-depth interviews. Hence, my role as researcher moved from one of anonymity during the quantitative data collection process to one that was visible to participants as the interviewer in the qualitative interviewing process. Within the tradition of in-depth interviewing, I became the research instrument, using a series of instructional statements from the EICLS Inventory (Mazo, 2008) to gain insight into the reflective choices that university educators make within the framework of a lesson. In qualitative research, "interviewing is an act of communication…. interviews provide such rich and substantive data for the researcher and are also a major part of qualitative research work" (Janesick, 2004, p. 71). As such, my role as researcher was fluid, moving from no contact with the participants during the quantitative data gathering phase to full disclosure as the researcher and interviewer during the qualitative in-depth interview phase of the study.

Methodology

Participant Selection Logic

   Population definition and characteristics. The population for this study

consisted of a broad spectrum of university educators within the United States and

Canada. This population was identified within the following two groups: Walden

University Participant Pool, and United States and Canadian universities via the

International Centre for Educators' Learning Styles (ICELS) website. Participants were a

cross-section of university educators who taught in various disciplines, whose teaching

experiences varied in length of time, who were representative of both male and female

genders, who derived from the United States and Canada, and who represented different

age groups.

   Sample. Drawn from a broad population, a sample of 50 university educators

from within the United States and Canada participated in this study. This study used a

convenience sample, given that the participants derived from university educators from

the United States and Canada, as well as from a group of the Walden University

Participant Pool within the United States.

   Selection and eligibility criteria used to draw the sample included the following:

must be teaching or have taught within the previous 12 months at a university within the

United States and Canada, and must be 18 years or older. With the permission of Walden

University, information about the study, a call for participants was placed in the Walden

Participant Pool online site. The participants were directed to begin the study through an

online link which contained: explanation and description of the study, Participant

Consent Form, and the EICLS Inventory (Mazo, 2008). Before proceeding to the

inventory, participants were required to complete six demographic questions to which

they responded (Appendices C and D). These questions were designed to determine

whether the participants met the criteria for the study which were based on their

eligibility as described previously. Upon completion of the inventory, participants were

asked if they would agree to participate in a one-on-one in-depth interview allowing them

the opportunity to expand on the conscious instructional choices they made in the EICLS

inventory, and to share any reflections about these choices.

Recruitment of participants. Bias was eliminated, as Part I: Inventory was

anonymous and did not collect participant names. As well, I acted as the contact person

for any participants who may have had questions regarding the study. Only the names of

participants who agreed to be interviewed were known. Communication with the

participants was conducted online through email. The research data collection began

January 2014 and was completed in January 2015. During this time 50 university

educators' participated in Part I: Inventory. In-depth interviews (Part II) were conducted

with seven university educators. The diversity of the sample and the number of

participants provided a broad base of results within the context of this study.

Instrumentation

This study used a mixed methods sequential explanatory research strategy

(Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154) that

included an inventory for the quantitative part and an interview for the qualitative part.

The study was initiated with a quantitative data collection process through an

administered inventory (Part I): EICLS Inventory (Mazo, 2008). Those participants who

agreed to participate in Part II: Interview participated in a 1-hour in-depth interview

session where they were able to articulate their reflections in relation to the instructional

choices they made when completing the EICLS Inventory (Appendices B, C, and D). The

responses that were recorded in the EICLS Inventory were used to structure the in-depth

interviews.

The following describes the processes and procedures that were used to develop

the quantitative inventory. Additionally, a detailed description is included on how this

instrument recorded university educators' instructional choices within the framework of a

lesson (development, delivery, and debriefing), to identify the learning styles of

educators, and to identify educators' learning styles usage patterns. As well, a description

of the qualitative questionnaire is provided. Furthermore, information is provided that

explains how reliability and validity for this data gathering instrument has been

established.

Quantitative inventory instrument. Numerous and various models and

instruments exist that are designed to identify and describe learning styles (Dunn, Dunn,

& Price, 1985; Entwistle, 1981; Felder & Solomon, 1991; Gregorc, 1982; Honey &

Mumford, 1992; Kolb, 1984; Reichmann & Grasha, 1974; Riding & Rayner, 1998;

Vermunt, 1994). Considerable resources have also been expended on reviewing,

analyzing, and categorizing these models and instruments for validity, reliability,

consistency, and usability (Cassidy, 2004; Coffield et al., 2004; Curry, 1987; De Bello,

1990; Riding & Rayner, 1998; Swanson, 1995). Significant discussion regarding learning

styles, how they are defined, how they are measured, and where they are effectively

applied has elicited a critical need to comprehend how humans learn in relation to

learning zones and environments. The response to this fundamental query and reflection

has been shaped within the framework and in the form of models that explain learning by way of learning style descriptions.

Among those who have researched learning styles, Kolb (1984), Felder and Solomon (1991), Reichman and Grasha (1974), Riding and Rayner (1998), Gardner (1999), and Vermunt (1994) have added to and advanced the knowledge base of learning styles, each presenting their original understandings and perspectives on how humans cognate and learn. As a result of their research, all of these researchers developed an instrument that was based on their specific understanding of learning styles and how these styles could be scaffold, inventoried, and measured. Each researcher provided explanations and insights into their findings regarding learning styles, allowing for greater depth of knowledge to be made accessible for learning style preferences. In relation to this study, Kolb's combined theory, model, and inventory were selected as one of the bases that inform this study. In his seminal work, Kolb formulated his model of his experiential learning theory (ELT) of Growth and Development. Within his theory, Kolb developed his Learning Style Inventory (KLSI) which was based on his four modes of learning experience: abstract conceptualization (AC), reflective observation (RO), active experimentation (AE), and concrete experience (CE; p. 64), and which were used to articulate his four learning styles: convergent, divergent, assimilation, and accommodative (pp. 77-78). While all of these instruments provided a measurement for determining learning styles, none provided a method to determine how these learning styles are applied from the context of a university educator when he or she is engaged within the framework of a lesson (development, delivery, and debriefing). Therefore, the EICLS Inventory (Mazo, 2008) was developed (Appendices B-F).

The EICLS Inventory was developed in 2008 as part of my PhD program and was reviewed by the initial Chair of the dissertation committee. In 2011, the inventory was approved by the Research Ethics Board as part of a study that I conducted at MacEwan University where I teach. The study provided a preliminary level of use that assisted in affirming the statements of the inventory and in providing its prior application to this current study (Appendix G).

Qualitative interview. A series of questions were developed that were guided by the EICLS Inventory (Mazo, 2008). These were used to structure the one-on-one in-depth interviews for Part II of the study (Appendix H). Seven university educator participants agreed to be interviewed to reflect, explain, expand upon, and clarify the responses that they indicated when completing the EICLS Inventory (there are 20 responses in total). Reflections and explanations of each response were recorded in narrative format. This narrative format was analyzed for themes, trends, and commonalities within the content that supported the quantitative results.

Quantitative and qualitative applications of instrument. In this study, there were two parts that were used to understand university educators' reflective instructional choices within the framework of a lesson (development, delivery, and debriefing) and university educators' learning styles. The processes involved in determining these two parts included the completion of a research inventory and the application of a coding system which, when combined, constituted the quantitative data collection of the study, and the conduction of in-depth interviews which constituted the qualitative data collection of the study. A description of how these components were ordered within the

study is outlined below (See Appendix A for an illustrated view of the study's

processes.).

*Quantitative application***.** The first component (quantitative) identified a

university educator's instructional choices, identified a university educator's learning

style preferences, and identified a university educator's learning styles usage pattern all

within the framework of a lesson (developing, delivering, and debriefing). These learning

styles and their usage pattern were articulated within the parameters of a coding system.

The results from the EICLS Inventory (Mazo, 2008) were used to complete this coding

system (Appendix E).

The EICLS Inventory (Mazo, 2008) was designed to record educators'

instructional choices and to determine their learning style preferences within the

framework of a lesson (developing, delivering, and debriefing). The inventory comprised

20 sets of statements which were divided into three parts based on these lesson activities.

Each statement contained a set of five instructional choices, one of which the university

educator must select. As the educator indicated the instructional choice for each

statement, he or she was also indicating the learning style preference (Kolb's (1984) four

learning styles are embedded within each statement). The results of these choices were

combined to determine the learning style (dependent variable) preference of the

university educator within the stage of a lesson framework (independent variable) and

then inserted within the coding system that determined the learning styles usage pattern.

The coding system was developed in order to determine a university educator's

learning styles usage pattern within the instructional framework of a lesson

(development, delivery, and debriefing). The main *lesson activity* (la) within this

instructional framework and the *dominant learning style* (dls) that was identified within each of the three lesson activities were inserted into the coding system. This was performed three times to determine the university educators' learning styles usage pattern (Appendix E). There were 58 possible usage patterns (Appendix F). As such, the following coding system was applied.

Coding system: EICLSup = 3(la and dls)

A university educator's learning styles usage pattern (EICLSup) was determined by a combination of the lesson activity (la; development, delivery, and debriefing) and the educator's dominant learning style preference (dls) identified within that activity. The (la and dls) coding statement of the coding system was repeated three times, each time representing each lesson activity (Appendix E).

Qualitative application. The second part (qualitative) of this study, which is the identification of a university educator's consciously reflective instructional choices in relation to the three main activities of a lesson, was articulated through the process of content analysis where emerging themes, concepts, and attributes were identified. Krippendorf's (2012) content analysis methodology was followed when conducting the content analysis. Following is a general description of how these reflections were obtained.

Based on the conscious instructional choices the university educator indicated within the EICLS Inventory (Mazo, 2008), he or she was asked to explain, describe, articulate, and reflect on these choices. The reflections that were gathered underwent a content analysis process where emerging themes, concepts, and attributes were identified relative to the three main activities within a lesson framework.

Prior Application of Instrument

The EICLS Inventory (Mazo, 2008) was applied in a prior research study that involved comparing communication and learning styles of university educators. The study was conducted at MacEwan University from September - December 2011. Data gathering occurred over an 8-week time period from November 2 to December 31. The Educators' Application of Their Learning and Communication Styles (EALCS) Inventory was used within this study, with Part I comprising statements developed for the application of learning styles during lesson activities, and Part II comprising statements formulated for application of communication styles during lesson activities. The population included all faculty members (approximately 500) who were full-time, sessional, and term in status and who had taught over the previous 12 months or were currently teaching. There were 118 participants who responded to the study; however, some did not fully complete the inventory and some did not meet the demographics for the study. As such, a total of 72 valid responses were used in the data analysis process of the study. The inventory was made accessible via an online link where the participants completed it at their computers. The EALCS Inventory was designed to compare the applications of communication and learning styles during lesson-level organization activities. The results of this study are included in Appendix F. Within these results, the responses gathered from the learning styles component of the study were the initial applications of the instructional choice statements used in the EICLS Inventory.

Need for reflection. One of the important outcomes of the research study conducted at MacEwan University was that several participants expressed a need to explain, elaborate, and contemplate the instructional choices they recorded in the EALCS

Inventory. However, capturing these conscious reflections was not part of the study.

Given this need for participants to extend beyond the quantitative data gathering method,

a gap in knowledge was identified due to the lack of a communication venue available for

participants to record their reflections about the choices they made when completing the

EALCS Inventory. Hence, the need to gain a deeper understanding as to why university

educators selected specific responses in the EALCS Inventory became apparent. As well,

a preliminary level of reliability obtained through the EALCS Inventory provided a

platform of process and data from which to draw upon when using the learning styles

section of the EALCS Inventory within this current study.

Data Collection: Procedures

Given that the mixed methods sequential explanatory strategy (Creswell, 2009, p.

211; Teddlie & Tashakkori, 2009, pp. 153-154) was used to gather data, the Data

Collection Plan comprised two parts: Part I – Quantitative Data Collection Processes

(Inventory), and Part II – Qualitative Data Collection Processes (Interview). The

following outlines the details of these two processes. See Appendix A for an illustration

of the complete details of the study, including purpose, design, variables, and data

collection processes, procedures, and products.

Part I: Quantitative data collection procedures (inventory). Following were

the procedures used for recruitment, participation, and data collection:

1. Posted a general invitation to participate in the study. This was done through

   two online locations: Walden Participant Pool, and ICELS website. Both

   locations provided a description and an online link to the EICLS Inventory

   (Mazo, 2008).

2. Provided participants with further details about the study including a description of the study, an explanation of the processes and procedures involved in the study, and an online link that directed the participants to a secured location to begin the study.

3. Ensured that the participant had read and agreed on the Part I: Inventory Participant Consent Form before beginning the study. The participant was not allowed to begin the study until the form had been read and the participant had clicked on "I accept".

4. Asked the participants to complete the six demographic questions before proceeding to the EICLS Inventory (Mazo, 2008; Appendices B, C, and D).

5. Asked the participants to complete the EICLS Inventory (Mazo, 2008) online through a secure database where anonymity had been established. Participants completed this online inventory (approximately 20 minutes) at their computers through a link located in the Walden Participant Pool and in the International Centre for Educators' Learning Styles (ICELS) website.

6. Captured and recorded all information provided by participants in a secure online database that was linked to the Walden Participant Pool and the ICELS websites. There were no identifiers attached to the participants' data to ensure that they were anonymous.

7. Monitored and provided online support for participants as they completed the inventory. The support was provided through an email address dedicated specifically for the research study. This email address and all information will be destroyed within two years after data collection has been completed.

8. Asked participants if they wanted to participate in Part II: Interview, which involved a 1 hour in-depth interview (through web-conferencing or face-to-face). At the end of the EICLS Inventory (Mazo, 2008), participants were asked to indicate if they were willing to participate in Part II: Interview. Those who agreed were asked to provide their name and email address so that they could be contacted. The participant was able to respond via a designated email address.

9. Conducted data analysis with recorded data from the database. (See Data Analysis Plan)

   Debriefing procedures after Part I (inventory). Upon completion of the EICLS Inventory (Mazo, 2008) which was accessed and completed online, the final question of the inventory asked participants if they would like to participate in the qualitative part of the study which involved a 1-hour in-depth interview. If they chose to participate in Part II of the study, they were asked to contact me for further information regarding this segment of the study. The participants were provided with information about the interview stage of the study, and about scheduling interview times. Only participant information was known about those who consented to be interviewed for Part II of the study. A designated email address was provided to the participants to facilitate communication.

   Part II: Qualitative data collection procedures (interview). Following were the procedures for recruitment, participation, and data collection:

1. Invited participants who completed Part I: Quantitative Data Collection Processes (Inventory) to participate in Part II: Qualitative Data Collection

Processes (Interview). Seven participants of the sample population

participated in individual in-depth interviews that enabled the participants to

share their conscious reflections, insights, attitudes, and rationales on the

instructional choices they made when completing the EICLS Inventory

(Mazo, 2008). The university educator's recorded responses from the EICLS

Inventory were used as a guide along with the Part II: Qualitative Interview

Questions (see Appendix H) during the interview session.

2. Obtained consent from participant. Those participants who completed Part I:
   Inventory and had provided their name and email address indicating that they
   would like to participate in Part II: Interview (approximately 1 hour
   interview) were contacted and sent via email a copy of Part II: Interview
   Consent Form. By replying to this e-mail with the words "I Consent" the
   participants were agreeing to participate in Part II: Interview and to be audio
   recorded.

3. Conducted the in-depth interviews via web conferencing technology. Local
   participants had the option of conducting the interview face-to-face,
   depending on availability.

4. Transcribed interview data into an online application for data analysis. (See
   Data Analysis). Upon request, participants were sent a password protected
   copy of the audio recording and transcript (written) through the Internet.

   In-depth interviews. The intent of the interview was to record the participants'

conscious reflections with respect to the instructional choices they made when

completing the EICLS Inventory (Mazo, 2008). Times and dates of in-depth interviews

were organized with seven participants of the sample population (university educators from the United States and Canada) who completed the EICLS Inventory. Those participants who agreed to participate were interviewed face-to-face, or by web-conferencing. Only the participants who agreed to be interviewed were identified for this component of the data gathering process. The narrative data was analyzed using content analysis processes using Krippendorf's (2012) methodology.

Data collection procedures, including the contacting of participants, the scheduling of interviews, and the input of data were conducted systematically. In-depth interview sessions were conducted with each participant. Reflections were audio recorded with respect to the participants' instructional choices made when completing the EICLS Inventory (Mazo, 2008).

Debriefing procedures after Part II (interview). Upon completion of Part II: Interview of the study which involved an in-depth interview, participants were able to make contact via email, if they had any questions regarding the interviews. An email address was provided to the participants to facilitate communication.

Data Collection

For Part I: Inventory, 50 university educators participated in the EICLS Inventory (Mazo, 2008) that was located online. However, 38 participants fully completed the inventory which were eligible for use in the study. Twenty-four participants were female and 14 participants were male. For Part II: Interview, seven university educators, who had completed the inventory and indicated their willingness to participate in Part II, were interviewed. Five participants were male and two participants were female.

Location, frequency, and duration. All participants were located in the United States or Canada and taught at universities from either country. Participants were situated in the states of Washington (DC), Maryland, Ohio, Arizona, California, Nebraska, Colorado, Texas, and Washington ($n = 25/38$; 65.7%). Participants from Canada were situated in the provinces of Alberta, Saskatchewan, Ontario, and Quebec ($n = 9/38$; 23.6%). Four participants did not indicate geographical location. This participant representation provided sufficient diversity of geographical locations within the designated boundaries set by the study. Duration of the data gathering process for the study was for 1 year.

Recording process. Data were recorded using two methodologies: online inventory database, and interview audio recording.

Part I: Inventory (quantitative) recorded data through an online inventory situated within a secure database. University educators accessed the EICLS Inventory (Mazo, 2008) through two websites: Walden Participant Pool, and ICELS (a dedicated website for the study). Participants completed six demographic questions and 20 sets of statements comprised within the inventory. Responses to the demographic questions and the 20 statements were recorded within this database. All participants were anonymous and assigned a participant number. However, if the participants agreed to participate in Part II: Interview, then these individuals provided their email so that they could be contacted to schedule a one-on-one interview.

Part II: Interview (qualitative) included participants who had completed Part I: Inventory and were willing to be interviewed about the responses that they recorded in their inventory. Before proceeding with the interview, the participants were sent via email

a Consent Form that they read. They then returned an email indicating their consent to participate in the study and to be audio recorded. Participants were interviewed using three modes of communication: web conferencing, in-person, and telephone. While using these types of interview modes, the participants were audio recorded when providing insights, reflections, and explanations about the responses they recorded in the EICLS Inventory (Mazo, 2008). Hand notes were taken during the interviews for the purpose of creating a backup in the event the recording was dysfunctional for some reason. The audio recordings were transcribed in a Microsoft Word document for use in data analyses.

Variations and unusual data collection. Data collection for Part I: Inventory was standard and did not present any variations. The data collection process for Part II: Interview included primarily Skype web conference interviews for participants who were located in areas across the United States and Canada. Two in-person interviews were conducted, given that the participants were located nearby. One participant asked to be interviewed by telephone because he did not know how to work with Skype video conferencing technology. This participant was accommodated and the interview was conducted using the telephone speaker function so that the audio recorder could record the interview through the telephone.

Data Analysis Plan

The following provides information about the quantitative and qualitative analyses that was used for this study

Quantitative analysis. Data analysis was conducted using a statistical software application. The data collected from the EICLS Inventory (Mazo, 2008) was stored in a

secure online database. Data screening of participants' eligibility for the study occurred

prior to beginning the inventory. Data cleaning and screening procedures began with the

screening of participants through the initial six demographic questions (Appendix C).

Regarding data cleaning, participants who had not completed the inventory were not

included in the data used for this study. Information from those participants who had not

completed the inventory was not used in the main data.

Quantitative variables. The independent and dependent variables for this study

are defined and described below.

All *independent* variables within this study were comprised within the EICLS

Inventory (Mazo, 2008). One demographic (independent variable) was included at the

beginning of the inventory: *discipline/specialty.* The *stage* (independent variable) of a

lesson framework with three levels (development, delivery, and debriefing activities),

were embedded within the inventory structure. Within each lesson activity of this

framework, university educators were guided through a series of instructional statements

where they selected their individual instructional choices (See Appendix D that

articulates the sets of instructional statements included under each of these independent

variables.). All independent variables are described below.

Independent variable: Lesson framework stage—development activity level.

This i*ndependent* or treatment variable was measured using the EICLS Inventory (Mazo,

2008). It was Part I: Lesson Development and comprised four sets of instructional

statements, each of which university educators were asked to select one instructional

choice (See Appendix D that articulates the sets of instructional statements included

under this independent variable.). These instructional choices were recorded and were

used as part of the qualitative in-depth interview framework in order to obtain university educators' conscious reflections regarding these instructional choices.

Independent variable: Lesson framework stage—delivery activity level*.* This i*ndependent* or treatment variable was measured using the EICLS Inventory (Mazo, 2008). It is Part II: Lesson Delivery and comprised twelve (12) sets of instructional statements, each of which university educators were asked to select one instructional choice (See Appendix D that articulates the sets of instructional statements included under this independent variable.). These instructional choices were recorded and were used as part of the qualitative in-depth interview framework in order to obtain university educators' conscious reflections regarding these instructional choices.

Independent variable: Lesson framework stage—debriefing activity level*.* This i*ndependent* or treatment variable was measured using the EICLS Inventory (Mazo, 2008). It is Part III: Lesson Debriefing and comprised four (4) sets of instructional statements, each of which university educators were asked to select one instructional choice (See Appendix D that articulates the sets of instructional statements included under this independent variable.). These instructional choices were recorded and were used as part of the qualitative in-depth interview framework in order to obtain university educators' conscious reflections regarding these instructional choices.

Independent variable*: **One demographic***. While there were four demographics included in this study, only one was used to gather data in response to quantitative research question four (RQ4): discipline/specialty. These data were collected at the beginning of the EICLS Inventory (Mazo, 2008) and provided information regarding the university educator's discipline that he/she taught and whether there was a speciality

within the discipline. Age and teaching experience of the university educator were used to determine whether the participants met the eligibility criteria for the study: over 18 years of age, and taught within the previous 12 months at a university. However, these two demographics were not used as independent variables.

Dependent variable: Learning style. The individual instructional choices of a university educator were recorded when he or she completed the EICLS Inventory (Mazo, 2008), one from each of the 20 sets of statements in the inventory. These instructional choices were used as a basis for the qualitative in-depth interviews that enabled university educators to explain and reflect upon their choices. The combined instructional choices from the inventory resulted in one dominant learning style of the educator as it was applied in the three stages of a lesson framework (development, delivery, and debriefing).

Dependent variable: Learning styles usage pattern. University educators' dominant learning styles that were identified as a result of completing the EICLS Inventory (Mazo, 2008). were inserted into the EICLSup = 3(la and ls) coding system to determine the learning styles usage pattern of each university educator as these patterns related to the instructional framework of a lesson (development, delivery, and debriefing). This pattern indicated which learning style dominated within each part of the lesson framework and provided insights into the relationship between university educators' conscious reflective instructional choices and their learning styles.

Qualitative concept: Conscious reflection. The 20 individual instructional choices of a university educator that were recorded when he or she completed the EICLS Inventory (Mazo, 2008) were used as a basis for the qualitative in-depth interviews that

enabled university educators to explain and reflect upon their choices. Using the

university educators' inventory responses to structure the interviews, educators were

asked to explain their responses in detail. These explanations were in the form of

reflections, attitudes, and rationales for their responses. Individual university educators

was the unit used for analysis. Data included a detailed description of each of the seven

participants. Content analysis was done using the Krippendorf (2012) methodology

which includes four stages: (a) unitizing (conscious reflections of university educators),

(b) sampling (seven university educators), (c) recording/coding (development of a code

book), and (d)) analysis (themes and commonalities within the recorded interview texts).

This analysis clarified and provided meanings to the conscious reflections of university

educators. These reflections were used to identify parallels with the quantitative data

recorded in the EICLS Inventory.

Statistical Analysis

      Quantitative analysis. For quantitative data, statistical software was used to

perform the statistical analyses to determine the descriptive statistics (Appendix G).

      Qualitative analysis. Data analysis was conducted using the QDA Miner

software application. Emergent coding was used for analysis of data from the in-depth

interviews. This approach provided a determined list or coding framework of categories

from which to work within. This was in contrast to an *a priori* coding approach where the

researcher constructs a prescribed list of coding categories and identifies these categories

as they occur within the text being analyzed. The following section provides an overall

description the mixed methods sequential explanatory design.

Data Analysis Processes

        Process from coded units to larger categories/themes. The processes used to move inductively from coded units to larger representations including categories and themes are described and outlined below for both quantitative and qualitative data.

        Quantitative coded units to larger categories. Coded units and categories were identified and applied during the quantitative data analysis process.

        Coded units. Contemplative and deliberative processes were applied when developing the units and categories for the EICLS Inventory (Mazo, 2008). The development and the creation of the inventory included 26 units in the form of six demographic questions and 20 sets of statements where university educators chose their best-suited answer. The demographic units included gender, age range, name of university, number of teaching years, teaching within 12 months prior to the study, and discipline/specialty of the educator. Each demographic was coded based on the responses provided. Regarding the 20 sets of statements that were included in the Inventory, each set contained four coded statements that were presented as choices for the participants who participated in Part I: Inventory of the study. These four statements were coded with Kolb's (1984) Learning Styles that included convergent (C), divergent (D), assimilation (AS), and accommodation (AC). These coded units were recorded in the database of the inventory and further analyzed for individual educator learning styles application. As well, they were analyzed in order to determine which discipline/specialty applied what learning styles within the framework of a lesson (development, delivery, and debriefing). See Appendix D for a coded version of the inventory.

Larger categories. Once these units were coded, the results were grouped using three core categories that represented the three main parts of the Inventory: 1) development of a lesson, 2) delivery of a lesson, and 3) debriefing of a lesson. It is these three categories that largely defined and represented the structural and instructional integrities of the inventory and the data. Using these three categories, an analysis was conducted to provide a detailed and comprehensive understanding of the data. Each group comprised the following coded units:

- Four demographic variables (independent variables): gender, age range, discipline/specialty, and years of teaching experience

- One learning style (dependent variable)

- One resulting learning style usage pattern (dependent variable; using the EICLSup = 3(la and dls))

- One lesson framework stage from the EICLS Inventory (Mazo, 2008) (development, delivery, or debriefing; independent variable)

Qualitative coded units to larger categories. Coded units and categories were identified for use in the qualitative data analysis.

Coded units. The units that comprised the qualitative data included the following:

- Age range

- Discipline/specialty

- One framework of a lesson stage within the EICLS Inventory (Mazo, 2008; development, delivery, or debriefing)

- Theme 1 = Shifts in learning styles application as they relate to the framework of a lesson

- Theme 2 = Adaptation of educators' learning styles applications

- Theme 3 = Reflections on how learning styles are applied within a lesson framework

Larger categories. The larger categories of the qualitative data gathered during the one-on-one interviews included the three stages of the framework of a lesson: 1) development of a lesson, 2) delivery of a lesson, and 3) debriefing of a lesson. Qualitative data were grouped within the three stages of the framework of a lesson. These three stages were used to group information as an initial understanding and then used as a basis from which to examine the quantitative and qualitative data.

Emergent codes, categories, and themes. Emergent codes comprised the demographics of age range, teaching experience, and discipline/specialty. Additionally, the codes of the four learning styles were emergent within the content analysis of the interview texts. Dominant codes were revealed when comparing how participants demonstrated the need to accommodate student learning and classroom teaching through accommodation.

Qualities of Discrepant Cases

The discrepant cases within this study included participants who began the survey by completing the questions focused on demographics such as gender, age range, years of teaching, teaching within 12 months, name of institution, and teaching discipline/ specialty. There were 12 cases where the participants partially responded to or stopped after responding to the demographic questions. Some potential factors that influenced this

behavior included lack of time to complete the survey, and unwillingness to complete the survey.

Description of the Study

Part I of this study collected quantitative data within a secured online database by using the EICLS Inventory (Mazo, 2008; Appendices B, C, and D). This process recorded the instructional choices university educators' made within the framework of a lesson (development, delivery, and debriefing) and simultaneously recorded the learning styles of these educators (dependent variable). The results of these recordings were used in three ways: the 20 instructional choices of the university educator were used to guide the qualitative in-depth interviews that enabled educators to reflect on their choices; the learning styles recorded were used to identify the dominant learning styles applied within each part of the instructional framework of a lesson (development, delivery, and debriefing); and the three dominant learning styles that were identified in each part of the instructional framework of a lesson were used to identify university educators' learning styles usage patterns through the applications of the coding system EICLSup = 3(la and dls). Part II of this study collected qualitative data from seven university educators by conducting individual in-depth interviews in order to record reflections that these educators experienced when making the instructional choices when completing the EICLS Inventory. Interviews were conducted using face-to-face and online web-conferencing communication methods. The data from the two parts of the study were integrated to identify inferences and insights between university educators' consciously reflective instructional choices and their learning styles within the framework of a lesson (See Appendix A for a visual model.).

Integration of quantitative and qualitative data. The synthesis of both types of data was done through the process of integration demonstrated within a comprehensive table that shows the means and standard deviations of the variables used for each group. This table was accompanied by relevant conscious reflections articulated by university educators.

Threats to Validity

Both internal and external threats to validity have been examined within the context of the sequential explanatory mixed methods research design (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). The following provides information regarding internal, external, and statistical conclusion validity.

External Validity

There are three types of threats to external validity: interaction of selection and treatment, interaction of setting and treatment, and interaction of history and treatment (Creswell, 2009, p. 165). A discussion regarding how these issues were addressed in the study ensues.

Interaction of selection and setting in relation to treatment involves how the results of the study can be generalized to specific populations or settings. The results of the study were presented in relation to the specific groups and settings used within the study, and not to any groups or settings that had not met the characteristics and criteria required to enter the study. Regarding *interaction of history and treatment,* the study was conducted within a set time period designated for the study which was 1 year. As such, if a comparison was required beyond the time span of this study, then additional studies would be required to see if similar or same results were found.

Internal Validity

There are 10 possible types of threats to internal validity that require consideration: history, maturation, regression, selection, mortality, diffusion or treatment, compensatory/resentful demoralization, compensatory rivalry, testing, and instrumentation. These are discussed in relation to this current study, including the actions that have been taken to address any threats that may exist (Creswell, 2009, p. 211).

Given that this mixed methods study was sequential explanatory in design (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154), it followed that there would be a *history* that accompanied the participant who completed the first part of the study (inventory) when advancing to part two of the study (interview). To ensure that there was minimal lapse of time between the two parts, a time limit of seven days (1 week) was implemented for the participant interview to take place. However, in some cases, this time limit was not met because of the availability of the participant due to scheduling issues. As such, the interviews were scheduled as soon as possible.

The issue of *maturation* during the study did not occur during the completion of the inventory by participants (Part 1), which took approximately 20 minutes. Those participants who moved from Part 1 to Part 2 (interview) were provided with a minimum time of 1 week for reflection regarding their responses. As well, all participants were adults (18 years and over), were situated within a higher academic environment, and all fulfilled the role of a professor, instructor, or lecturer. These characteristics provided a common base for the sample population and indicated a common maturation level.

Regression was addressed by removing the extreme scores that were both very high and low. By doing so, those participants who consented to participate in the second part of the study (interview) derived from a population that met the characteristics of the population (over 18 years, and have taught within the previous 12 months). Participants responded to six demographic questions to provided details about these characteristics.

Regarding the process of *selection*, participants derived from two population groups. The *first* group came from the Walden Participant Pool which comprised Walden students, and Walden faculty, as they were a natural group of participants to access through Walden. These Walden students were those who were engaged in teaching at other universities while completing their studies at Walden. These two Walden sub-groups provided a diverse overall population for the study. The *second* group of participants was external to Walden University. These participants included all types of faculty who taught in different universities in the United States and Canada. All participants from these groups were provided with information about the study and were given the opportunity to participate in the study or not. As the researcher, I was responsible for the data collection for part I of the study (inventory completion). Hence, participation was done randomly based on the participants' willingness to engage in the study.

The issue of *mortality* was addressed by ensuring that the sample was large enough to continue, in the event that there are those who do not finish the study. A total of 50 participants participated in Part I: Inventory, and a total of seven participants were included in Part II: Interview. These numbers were large enough to support the study.

Diffusion of treatment did not affect participants as they were located in different areas, and they individually completed the inventory and the interview in an online setting. Hence, participants were not assembled in any size of groups while the study was being conducted. As well, the issues of *compensatory/resentful demoralization* and *compensatory rivalry* amongst participants were not present in this study, given there were no control and experimental groups. Any disparity in benefits did not exist, as all participants underwent the same process.

Testing of participants occurred once in part one of the study which was the completion of the inventory (approximately 20 minutes). Participants were not asked to complete the same inventory a second time, removing any familiarity of previous responses. As such, the *instrument* was administered only once during the study.

Construct Conclusion Validity

According to Trochim (2006), "construct validity refers to the degree to which inferences can legitimately be made from the operationalizations in your study to the theoretical constructs on which those operationalizations were based. You might think of construct validity as a "labeling" issue. When you measure what you term "self-esteem" is that what you were really measuring?" (Knowledge Base, Construct Validity, para. 1). In relation to this study, Kolb's (1984) four learning styles as they were identified and described within his his experiential learning theory (ELT) have been operationalized and applied directly within the measurement tool which is the EICLS Inventory (Mazo, 2008). This direct operationalization of Kolb's four distinct learning styles enabled clear measurement of educators' application of learning styles within the framework of a lesson. Within construct validity, there are the convergent validity and discriminant

validity types, which are relevant to this study. With respect to convergent validity, obtaining similarity to other and previous operationalizations of Kolb's four learning styles is demonstrated in Chapter 2, as these learning styles have been operationalized by many and various researchers for over 30 years. However, in relation to discriminant validity, this study operationalized Kolb's four learning styles within the context of the three main activities of a lesson (development, delivery, and debriefing), which has not been previously done in other studies. To address this dissimilarity, a previous study was conducted (Mazo & Thira, 2013) that operationalized Kolb's four learning styles within a similar context (Appendix G). The results of the inventory were generalizable based on the diverse population base, which was national and international, and included gender representation and various teaching disciplines/specialties.

Issues of Trustworthiness

A study's trustworthiness was premised on its credibility, transferability, dependability, confirmability, and intra-/intercoder reliability. Following is a discussion regarding these issues in relation to this study.

Credibility of this study was addressed through three strategies: triangulation, peer review, and reflexivity. *Triangulation* was established by way of using both quantitative and qualitative methods and inventory and interview methodologies to obtain data. The initial data gathering comprised results from the inventory that participants were asked to complete. Those participants who consented to participate in the second stage of the study (interview) were asked to expand on the choices that they made when completing the inventory. The results from the inventory and from the interview were compared for similarities and differences in order to determine the association between

learning styles, lesson development activities, and reflections. *Peer-review* was

conducted using various methods. The study underwent review from the dissertation

committee members, and the Internal Review Board (IRB) for rigor.

   Transferability of results from this study was established by ensuring that there

was a broad selection of participants deriving from two groups. These groups provided a

wide range of participants representing gender, age, teaching experience, and teaching

discipline/specialty. This diversity of population enabled transference of the results to

similar groups outside of the two groups used within this study. *Dependability* was

established in this study through triangulation. The results from the inventory were

expanded upon through in-depth interviews of seven participants who articulated their

deep reflections regarding the responses they indicated in the EICLS Inventory (Mazo,

2008). Additionally, *confirmability* was established through reflexivity where the

relationship between the cause and effect within the study was examined. As well, *intra-*

and inter-coder reliability was verified through review and examination of results by the

dissertation committee chair and myself (researcher).

Ethical Procedures

   Participant access agreements. A participant Consent Form was developed for

the purpose of obtaining consent from participants to participate in the study. The form

was situated at the beginning of the EICLS Inventory (Mazo, 2008). All participants were

required to read and agree to the information and conditions described and explained

about the study before they were allowed to proceed with Part I: Inventory. Upon

completion of the study, participants were asked if they were willing to participate in Part

II: Interviews. This form was available online where the participants recorded their

agreement to participate in the study. This information was stored in a secure database. This form was approved by the IRB before proceeding with the study.

Treatment of human participants. Historically, the protection of humans involved in research studies has been negligent, ignorant, and in some cases tragic. World War II was a testament of the horrific research studies that were conducted in Germany where human subjects were forced to participate without consent or knowledge of what the study would involve. The physical, mental, and emotional harm of a participant was not considered, leaving many traumatized to the point of death. The revelation of such uncontrolled infliction of deep human suffering and the absence of basic human compassion and protection of research participants stunned the world. The Nuremberg Trials against those who committed these human atrocities under the guise of research resulted in the development of the Nuremberg Code (National Institutes of Health, 2012) which was formulated in August, 1947 (Shuster, 1997, p. 1437). This Code clearly outlined the regulations and ethical guidelines that researchers worldwide are expected to comply with when research studies involved human participants.

Protection of human participants in research studies is critical to their success. It is a requirement that is foundational to the integrity of a research study. The Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Canadian Institutes of Health Research, 2005) document identified, outlined, and described eight guiding principles that constituted the framework in which researchers must adhere regarding research and human participants: respect for human dignity, respect for free and informed consent, respect for vulnerable persons, respect for privacy and confidentiality, respect

for justice and inclusiveness, balancing harms and benefits, minimizing harm, and maximizing benefit (pp. i5-i6).

Respect for human dignity is "the cardinal principle of modern research ethics" (p. i5) which is the foundational principle to the other seven. It protects the multi-level physical and psychological interests of research participants, as well as the cultural aspects of individuals. The principle of "free and informed consent" respects human participants' rights to make their own decisions regarding a research study, including the expectation to receive clear and accurate communication about the roles and responsibilities of all those involved in a study (researcher, participant, research ethics board). The third principle, respect for vulnerable persons, protects the rights of individuals who are "children, institutionalized persons or others who are vulnerable" (p. i5) and emphasizes the responsibilities of the researcher to be cognizant of the special needs within these groups of participants. Respect for privacy and confidentiality (fourth principle) forms part of human dignity and recognizes the importance of protecting human participants' personal information from others, thus keeping them anonymous. The fifth guiding principle, respect for justice and inclusiveness, recognizes that "fairness and equity" are critical to establishing and maintaining equal treatment of all human participants in research studies and that individuals "are not exploited for the advancement of knowledge" (p. i6). Balancing harms and benefits, minimizing harm, and maximizing benefit are the remaining three guiding principles that focus on exerting critical attention to ensuring that harms are minimized in consideration of all conditions and that the benefits from the research are justly distributed to all groups equally (p. i6).

Research studies are reviewed by the Internal Review Board within Walden University Research Centre with these main principles as guidelines to ensure that all human participants are treated equitably. Some principles may be more relevant or overt than others, depending on the nature of the research and the type of research methodology being applied. It is incumbent upon the researcher to adhere to the universal principle of human dignity and all other principles that are situated within its broader protection.

In this study, human participants were protected by following processes approved by Walden's IRB (01-17-14-0065939).

Treatment of Data

Treatment of data for the study included the following procedures.

Storage of data.

- Data will be kept locked in Lucille Mazo's (researcher) office located in Edmonton, Alberta, Canada. During data gathering, recordings and notes were kept on Lucille Mazo's password protected computer.

- Following the conservation period of a minimum of 2 years, print data will be shredded and electronic data will undergo a secure deletion process.

Recording and transcript. Upon request, participants would be provided with a password protected copy of his or her recording and transcript through the Internet. No requests were received.

Protection for Confidential Data

To safeguard the participant's identity, the participant was assigned a number (code) that replaced his or her name in the study. Any quotes used corresponded with the

code number that the participant was assigned. The participant's information was only available to me (researcher) unless the participant agreed otherwise.

Dissemination of Findings

Propagation and distribution of findings from this study will be presented in various methods and through various venues. These findings will be reported and presented within the parameters of a PhD Dissertation document and housed within Walden University's online repository of dissertations, where all students and faculty will have access to this dissertation. A defined number of bound copies will be produced for placement in the library within MacEwan University, Edmonton, Alberta, Canada. Findings of this study will also be presented at conferences: at an international education conference, and at MacEwan University faculty research showcase. The findings will also be showcased on the International Centre for Educators' Learning Styles website under the research section.

Summary

Chapter 1 focused on providing a detailed description of the study, which was conducted using a mixed methods sequential explanatory design where the quantitative method is designated as the dominant research paradigm and the qualitative method sequenced secondary (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). The EICLS Inventory (Mazo, 2008) was developed specifically to determine the educator's learning styles and learning styles usage pattern. The data from this inventory were used to populate the coding system that was used to identify the learning styles usage pattern of the educator. Extensive discussion was presented in the

knowledge areas of higher education and learning styles, educators and learning styles, and conscious reflective instructional choices.

Through the background of the study, these knowledge areas were explained within the context of universities and the need to understand the association between university educators' learning styles and how they affect their conscious instructional choices when engaged in lesson-level activities. For more than a century, research in the area of learning styles has been dominant in focusing on the learning styles of students, while minimal studies have focused on the learning styles of university educators and the impact they have on activities involved in lessons. This study has taken the position that such an impact has far reaching implications on higher education institutions, faculty training and development programs, educators' teaching approaches, and student learning outcomes. This study also took the position that in order to reveal theoretical knowledge about learning style preferences of educators and how they are applied during lesson activities, one approach is to identify university educators' personal learning styles as they relate to specific instructional choices. A second and interconnected approach that scaffolds into these choices was to hermeneutically listen to the reflective dialogue of specific narratives from university educators in relation to why they selected these instructional materials, content, techniques, and practices.

Chapter 2 was dedicated to presenting, establishing, and advancing the discussion on learning styles, how they relate to the theory of experiential learning from the context of university educators, and how they can propel the understanding of learning styles usage within the framework of a lesson (development, delivery, and debriefing). Detailed

explanations of theorists' work in the area of instructional design, learning styles, teaching styles, and reflection in learning were provided in this section.

While Chapter 2 established the theoretical foundations that support this study, Chapter 3 introduced the study's research method, design, and approach. In-depth description and explanation of the research paradigm and tradition were defined, articulated, and expanded in relation to the variables and phenomena being researched.

Chapter 4 provides detailed descriptions and explanations about the results of the data that were collected for the quantitative EICLS Inventory (Mazo, 2008) and for the qualitative interviews.

Chapter 4: Results

This mixed methods sequential explanatory study involved two purposes. The first purpose of the study was to determine learning styles and learning style patterns of university educators within the instructional framework of a lesson. The second purpose of this study was to discover and understand the meanings related to university educators' conscious reflective instructional choices.

The main research question for the study was as follows: How are the conscious reflective instructional choices that university educators make within the framework of a lesson (development, delivery, and debriefing) affected by their learning styles? Quantitative and qualitative subquestions were used to direct the data gathering and data analysis processes in order to successfully capture data relevant to the outcomes of the study. Quantitative subquestions included the following:

1) Do university educators' dominant learning styles remain constant within the instructional framework of a lesson (development, delivery, and debriefing)?

2) Do university educators' dominant learning styles indicate a specific lesson activity (development, delivery, or debriefing)?

3) Are there specific patterns of usage of university educators' dominant learning styles within the instructional framework of a lesson (development, delivery, and debriefing)?

4) Within a discipline/specialty, are there common dominant learning styles applied by university educators within the instructional framework of a lesson (development, delivery, and debriefing)?

Qualitative research subquestions included the following:

1. What criteria do university educators use to make conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing)?

2. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their learning styles?

3. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their discipline/specialty?

4. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their teaching experience?

Chapter 4 begins with an overview of the setting and demographics that guided this research, providing descriptions of where the inventory was completed and how the interviews were conducted in relation to the environment and location of data gathering. Participant demographics and characteristics relevant to the study are identified, described, and explained based on the sample population. A detailed description of the data collection process ensues. Data analysis processes are explained and articulated in relation to quantitative and qualitative approaches in the areas of groups, categories, and themes. Evidence of trustworthiness is demonstrated through the assessment of the results as they relate to credibility, transferability, dependability, confirmability, and intercoder reliability.

Setting

The concept of setting as it related to this study was defined by Habermas (1992), who argued that *space* could be a physical place or a virtual environment, as seen within the context of the Internet (pp. 421-461). Given this definition, online settings were primarily used with some in-person forms of access and communication within the study. An online link for participants to complete Part I: Inventory provided direct access to the instrument so that participants could record their responses to questions in the EICLS Inventory (Mazo, 2008). Access to the inventory was achieved through the Walden Participant Pool website and the ICELS website from January 2014 to January 2015.

During the data collection period, there were no significant influences that affected the participants in relation to the study. In general, no major economic, social, or political events occurred during the data gathering process that would have affected the responses of the participants.

Demographics

Collection of demographics provided relevant information about the participants in this study and established a foundation of knowledge about them. In Part I: Inventory, six demographic questions/statements were completed by the participants before proceeding to the EICLS Inventory (Mazo, 2008): gender, age range, years of teaching, teaching during the previous year, name of university, and primary discipline/specialty. Each demographic provided insights into the nature and characteristics of the participants and revealed various patterns within the sample population. Detailed descriptions and explanations of the participants are included within each demographic presented in the next section.

Gender

Male and female genders were unequally represented in the data sample. Sixty-three percent (63%; $n = 24/38$) of participants were female, with 36.8% ($n = 14/38$) being male.

Age Range

The age range was 26-66 years for both male and female participants, with an average age of 46 years.

Table 1

Age Range Demographic

Please specify your age range.		
Answer	Count	Percentage
18-25	0	0.0%
26-35	4	10.5%
36-45	9	23.6%
46-55	10	26.3%
56-65	11	28.9%
66 or older	4	10.5%

Years of Teaching Experience

The choice to collect information on number of years of teaching was based on my assumption that experience in developing a lesson plan, in delivering that lesson within a given environment, and in debriefing or reflecting on the outcomes of that lesson would increase the validity of the responses concerning the instructional choices that participants made in the EICLS Inventory (Mazo, 2008). Of the seven participants who were interviewed, all had taught for more than 5 years; some had taught for more than 20

years. The total number of years of teaching experience of the 38 survey participants was 423 (includes all participants), with an overall average of 11.13 teaching years. The highest number of teaching years was 44, as recorded by one university educator.

Teaching During the Previous Year

The importance of university educators having actively and recently taught within the previous 12 months was crucial to the credibility of the responses provided in the EICLS Inventory (Mazo, 2008) regarding their instructional choices. The seven participants I interviewed drew upon these recent teaching experiences to provide in-depth knowledge of their applications of learning styles and their teaching approaches. According to the EICLS Inventory, almost 90% of the entire study population ($n = 34/38$) had taught within the last 12 months of the academic year.

Institution Affiliation

University identification provided the locations from which the university educators came within the United States and Canada. Geographical information was critical to knowing which regions were represented by those who participated in the study. In relation to the EICLS Inventory (Mazo, 2008), over 92% of participants provided the name of the higher education institution where they taught. Only three of the 38 did not identify their institution's name. Additionally, once the institution was known, I obtained additional information from the institution's website in order to acquire deeper academic knowledge about each institution.

Primary Teaching Discipline/Specialty

Teaching disciplines included fine arts, business, education, science, and arts (social sciences), with the largest number of participants deriving from business (36.8%), as shown in Table 2.

Table 2

Primary Teaching Discipline/Specialty

	Frequency	Percentage
Fine arts	4	10.5%
Business	14	36.8%
Education	6	15.8%
Science	6	15.8%
Arts (Social sciences)	6	15.8%
No response	2	5.3%
Total	38	100.0%

Data Collection

Thirty-eight eligible participants completed Part I: EICLS Inventory (Mazo, 2008), which was located online. Twenty-four participants were female, and 14 participants were male. Data were collected and recorded within a database in the inventory and included participant demographics (gender, age range, number of years teaching, taught within 12 months, and discipline/specialty). From these participants, seven university educators were interviewed. Five participants were male, and two participants were female. Data were collected in the format of individual transcripts recorded during the interviews and transcribed for analysis.

Location, Frequency, and Duration

All participants were located in the United States ($n = 25/38$; 65.7%) or Canada ($n = 9/38$; 23.6%) and taught at universities in these countries. Four participants did not indicate geographical location. The diversity of location represented various types of universities. Only one university in Canada (MacEwan) was represented by more than one educator in both the inventory and the interview populations. Duration of the data gathering process for the study was 1 year (January 2014–January 2015).

Recording Process

Data were recorded using two methodologies: online inventory database for Part I, and interview audio recording for Part II. For Part I: Inventory, data were recorded through an online inventory situated at two locations. The Walden Participant Pool yielded very few participants; the ICELS dedicated website for the study was more accessible and successful in reaching participants. Recording of participant data for the inventory was anonymous. Data were situated in a secure database for analysis. All participants were anonymous, and each was assigned a participant number. Part II: Interview involved interviewing educators in one-on-one sessions that enabled them to provide reflections on and insights into their responses that were recorded in the EICLS Inventory (Mazo, 2008). These individuals had provided their email addresses so that they could be contacted to schedule a one-on-one interview. Participants were interviewed using one of three modes of communication: web conference, in person, or telephone. The audio recordings were transcribed in a Microsoft Word document for use in data analyses.

Variations and Unusual Data Collection

Data collection for Part I: Inventory did not present any variations. The data

collection process for Part II: Interview included primarily Skype web conference

interviews. However, two in-person interviews were conducted, given that the

participants were geographically located within relatively close proximity. One

participant asked to be interviewed by telephone because he did not know how to work

with Skype video conferencing technology; he was accommodated.

Data Analysis

This study used a mixed methods approach with a sequential explanatory design.

As such, the quantitative results of this study derived from an inventory and are presented

using descriptive statistics. Qualitative results were analyzed using the following two

approaches: Krippendorf's (1980) content analysis method (four stages: unitizing,

sampling, recording/coding, analysis), and a customized group analysis that included

defined variables (four demographics [gender, age range, teaching years, discipline]; four

learning styles [C, D, AS, AC]; and one learning style usage pattern).

Quantitative Results

Results of the study have been organized according to the sequence of the

processes involved in the mixed methods sequential explanatory design. First, data results

are presented from the inventory (quantitative), followed by insights derived from this

first stage of the study. In addition, the results of this study and a previous study

conducted by me (researcher) in 2010 that used the inventory are examined to further

demonstrate educators' instructional choices as they are used within the framework of a

lesson. Second, qualitative results are presented that include common themes from the

reflections and insights of the interviewed participants. Finally, two types of data are presented to indicate similarities and dissimilarities between the quantitative and qualitative data sets. To facilitate this comparison, a customized group analysis was used as a common set of variables.

Detailed tables that include descriptive statistics and group analyses are presented based on quantitative data collected from the EICLS Inventory (Mazo, 2008) as they related to the quantitative research questions.

Quantitative Research Question 1

Do university educators' dominant learning styles remain constant within the instructional framework of a lesson (development, delivery, and debriefing)?

The study examined the concept of whether university educators applied their learning styles consistently within a lesson framework as they created, presented, and reviewed their lesson. Table 5 provides a summary account of university educators' learning styles as they were applied throughout a lesson framework. The results from the EICLS Inventory (Mazo, 2008) indicated clear consistency in educators applying their learning styles when creating, presenting, and reviewing a lesson; the learning style of *accommodation* was applied by the majority of university educators. However, the style used in debriefing for a lesson activity was assimilation, demonstrating an inconsistent application of the dominant learning styles that were indicated from the results of the EICLS Inventory (see Appendix N for details).

The data in Appendix P indicated that in general, the common dominant learning styles applied by university educators did not remain constant throughout the three activities within the framework of a lesson. The general usage pattern of the university

educators was EICLS Usage Pattern 34 = AC and AC and AS. Pattern 34 showed that

participants from all five of the disciplines represented in the sample (fine arts, business,

education, science, and arts [social sciences]) changed the application of their learning

styles as they moved through the framework of a lesson (development, delivery, and

debriefing). As educators shifted from lesson development to the delivery of a lesson

activity, the majority of the participants ($n = 20/38$; 52.6%) applied the accommodation

learning style. This number of participants is noteworthy. However, there was a shift in

the application of educators' dominant learning styles when selecting instructional

choices in the third lesson activity of debriefing, where the greatest number of

participants applied the dominant learning style of assimilation ($n = 13/38$; 34.2%),

which Kolb defined as "disparate observations into an integrated explanation" (Kolb,

1984, p. 78).

　　The shift of the common dominant learning styles throughout the lesson

framework was noteworthy. First, the application of the accommodation learning style in

the first two lesson activities (development and delivery) demonstrated a constancy of

instructional choices that educators consistently used when developing a lesson and when

delivering that lesson to students. This constancy suggested that the majority of educators

were successful in applying the same dominant learning style from a development and

planning activity to an activity that enabled them to realize their instructional choices for

their lesson plan (delivery). This transition suggested that there is a natural evolution of

these two lesson activities, given that the first directly affects the second. In the case of

the third lesson activity of debriefing, the common dominant learning style application

changed to assimilation. While the majority of the participants remained constant in their

dominant learning style when creating and then delivering a lesson, change occurred when educators completed the debriefing of a lesson activity. This indicated a shift in approach to this reflective stage within the framework of a lesson.

In general, the data supported the idea that just over half of educators first made a selection of instructional choices during lesson development that were designed to accommodate learning and teaching activities; second, based on instructional choices, educators continued to apply the accommodation learning style when delivering a lesson to students; and third, educators shifted from a consistent application of the accommodation learning style to one that supported the lesson activity of debriefing, assimilation. Adaptation is a key characteristic and attribute of the learning style of assimilation, which suggests that the act of debriefing a lesson required the presence and realization of this characteristic. Hence, assimilation supported the requirement of adapting to change in a lesson based on reflection on the lesson. Educators who recognized this reflective need indicated this clearly in their instructional choices within the inventory, which supported the idea that adaptability of knowledge, experience, and articulation of lesson content were important to consider and respond to after the lesson was completed. The act of reflection is a catalyst for potential change that is needed to continually question, evaluate, and re-evaluate the development and delivery of a lesson.

Quantitative Research Question 2

Do university educators' dominant learning styles indicate a specific lesson activity (development, delivery, or debriefing)?

The study examined whether a specific activity within the framework of a lesson indicated a specific dominant learning style. As shown in Table 3, educators' first

instructional choices for the three lesson activities indicated a consistent and sequential

application of the dominant learning style of accommodation for the development (a1)

and delivery (a2) activities, and for the lesson activity of debriefing (a3), university

educators applied the dominant learning style of assimilation.

Table 3

EICLS Inventory, University Educators' Dominant Learning Styles Indicating a Specific Lesson Activity

Instructional choices based on application in a lesson activity	Part I: Development of a Lesson Activity (a1)	Part II: Delivery of a Lesson Activity (a2)	Part III: Debriefing of a Lesson Activity (a3)
1st instructional choice dominant learning styles Pattern 34	AC =accommodation Common dominant learning style = (23/38; 60.2%)	AC=accommodation Common dominant learning style = (20/38; 52.6%)	AS=assimilation Common dominant learning style = (13/38; 34.2%)
2nd instructional choice dominant learning styles Pattern 9	AS=assimilation Common dominant learning style = (7/38; 18.4%)	C=convergent Common dominant learning style = (11/38; 28.9%)	C=convergent Common dominant learning style = (10/38; 26.3%)
3rd instructional choice dominant learning styles Pattern 60	D=divergent Common dominant learning style = (5/38; 13.1%)	AS=assimilation Common dominant learning style = (5/38; 13.1%)	AC=accommodation Common dominant learning style = (7/38; 18.4%)
4th instructional choice dominant learning styles Pattern 18	C=convergent Common dominant learning style = (3/38; 7.8%)	D=divergent/ NR=no response Common dominant learning style = (1/38; 2.6% each)	D=divergent Common dominant learning style = (5/38; 13.1%) NR=no response (3/38; 7.8%)

In general, more than half of university educators applied the dominant learning

style of accommodation (AC; $n = 23/38$; 60.2%) during the first learning activity of

development of a lesson. Kolb (1984) defined this learning style as follows:

The greatest strength of this orientation lies in doing things, in carrying out plans

and tasks and getting involved in new experiences. The adaptive emphasis of this

orientation is on opportunity seeking risk taking and action. This style is called

accommodation because it is best suited for those situations where one must adapt

oneself to changing immediate circumstances. (p. 78)

Given this definition, it provides a direct explanation as to why educators applied

the accommodation learning style when developing a lesson, as well as demonstrates a

direct alignment with the instructional approaches that were selected by educators.

Because of the need to adapt content to the lesson that is being constructed, lesson

development requires action that is flexible to the needs of students, and to the needs of

the university educator who is teaching the lesson. Educators seek to embed and insert

teaching and learning strategies that adapt to the changing circumstances that continually

arise and exist within development of lesson. The ability for an educator to affect change

in learning begins in the planning activity of a lesson. Drawing upon their own learning

knowledge and their patterns of applying their knowledge, educators outline, organize,

and create the scaffolding for the lesson delivery.

When university educators transitioned from the activity of lesson development to

the second lesson activity of delivery, the results demonstrated a consistency in

application of the same dominant learning style (Table 3). Through their instructional

choices recorded within the EICLS Inventory (Mazo, 2008), university educators

indicated that 52.6% ($n = 20/38$) continued to apply the accommodation learning style as

their dominant learning style when delivering the content of a lesson. This consistency of

learning style application of more than half of the educators in the first and second lesson

activities is significant in that university educators' consciously chose to be uniform in implementing these activities. These results suggested that the university educator's consistent application of a dominant learning style during the development and delivery activities demonstrated how these two activities aligned sequentially in both process and implementation. Hence, there is a defined association and affiliation between development and delivery of lesson activities.

During the third activity of a lesson framework (debriefing) where university educators reflected on the lesson after it was completed, university educators indicated an overall fundamental shift to the dominant learning style of *assimilation*.

In assimilation, the dominant learning abilities are abstract conceptualization and reflective observation. The greatest strength of this orientation lies in inductive reasoning and the ability to create theoretical models, in assimilating disparate observations into an integrated explanation (Grochow, 1973). Here, it is more important that the theory be logically sound and precise. (Kolb, 1984, p. 78)

As shown in Table 3, more than one third ($n = 13/38$; 34.2%) applied the assimilation learning style when making instructional choices related to the activity of debriefing or reflecting after the lesson delivery.

However, what is most notable are second, third, and fourth levels of dominant learning styles as they projected the use of the styles in revealing patterns (Table 3). When examining the 2nd instructional dominant learning style pattern nine, there is a consistency of applying the convergent learning style in the delivery and debriefing lesson activities. This indicated a clear relationship between delivering a lesson and then debriefing or reflection upon that lesson after it was taught. The importance of applying a

convergent approach in the third activity of reflection suggested that university educators made instructional choices that included reflection as a core support to the lesson framework. Convergent style brings various ideas, thoughts, and concepts together into a cohesive understanding that draws from many different resources, allowing for a deeper comprehension of a lesson's content, intent, and success. In the third level of instructional choices based on learning styles application, educators applied three different learning styles, with the divergent learning style being used as the dominant learning style for the first time. This is an interesting discovery, indicating that the divergent learning style was dominant in only the planning stage of a lesson. Then, educators transitioned to the delivery and debriefing of a lesson and applied the assimilation and the accommodation learning styles respectively. Overall, educators were disparate within their third level of instructional choices.

The fourth level of instructional choices demonstrated a consistency between the delivery and debriefing of a lesson activities, where educators applied divergent as the dominant learning style. This is significant for three reasons: divergent learning style was the final choice for educators in relation to the other three styles being applied the most frequently and most in-depth; divergent learning style was considered by the least number of educators as a style that matched their personal learning styles and that met their needs for delivery and debriefing of a lesson; and divergent learning style calls "for generation of alternative ideas and implications, such as a "brainstorming" ideas session" (Kolb, 1984, p. 78). Based on educators' limited application of the divergent learning style, it can be observed that educators engaged in minimal activities that included broad-spectrum reflection within all three stages of a lesson framework. Indeed, this is a

concerning trend amongst educators who do not apply reflection as it relates to the lesson framework. Additional questions can be posed: Why is the divergent learning style applied so minimally by educators within a lesson framework? How does the divergent learning style's lack of use in a lesson framework affect learning and teaching? As early learners, is reflection being taught to potential and future educators? If not, then from where does an educator receive role models and training to include reflection in their own learning, which subsequently affects how they approach their own lesson evolution within a university setting? How does the lack of reflection affect lesson effectiveness? Additional research is required to understand this gap in university educators' learning style application behaviours when developing, delivering, and debriefing a lesson.

Quantitative Research Question 3

Are there specific patterns of usage of university educators' dominant learning styles within the instructional framework of a lesson (development, delivery, and debriefing)?

For the study, the EICLSup = 3(la and dls) coding system and a set of patterns of usage (Appendices E and F) were developed as a method to determine what learning style usage patterns were dominant within the framework of a lesson as they related to the instructional choices of university educators. Table 4 provides a list of the different usage patterns that were used by educators and provides the frequency in which these patterns were applied throughout the framework of a lesson (development, delivery, and debriefing).

Table 4

EICLS Inventory, University Educators' Dominant Learning Styles Within a Lesson Framework—General Patterns of Usage (n = 38)

Usage pattern number	Usage pattern	Frequency of usage pattern
EICLSup = 8	d(divergent) and c(convergent) and c(convergent)	2
EICLSup = 9	as(assimilation) and c(convergent) and c(convergent)	2
EICLSup = 10	ac(accommodation) and c(convergent) and c(convergent)	2
EICLSup = 12	d(divergent) and d(divergent) and c(convergent)	1
EICLSup = 17	d(divergent) and ac(accommodation) and d(divergent)	1
EICLSup = 21	as(assimilation) and as(assimilation) and as(assimilation)	2
EICLSup = 23	as(assimilation) and as(assimilation) and d(divergent)	1
EICLSup = 27	as(assimilation) and ac(accommodation) and as(assimilation)	1
EICLSup = 31	ac(accommodation) and ac(accommodation) and ac(accommodation)	4
EICLSup = 32	ac(accommodation) and ac(accommodation) and c(convergent)	2
EICLSup = 33	ac(accommodation) and ac(accommodation) and d(divergent)	1
EICLSup = 34	ac(accommodation) and ac(accommodation) and as(assimilation)	6
EICLSup = 35	ac(accommodation) and c(convergent) and ac(accommodation)	1
EICLSup = 38	c(convergent) and ac(accommodation) and ac(accommodation)	1
EICLSup = 39	d(divergent) and ac(accommodation) and ac(accommodation)	1
EICLSup = 55	ac(accommodation) and c(convergent) and as(assimilation)	4
EICLSup = 56	ac(accommodation) and as(assimilation) and c(convergent)	1
EICLSup = 58	ac(accommodation) and as(assimilation) and d(divergent)	1
EICLSup = 59	c(convergent) and ac(accommodation) and as(assimilation)	1
EICLSup = 61	Variations of responses that include nr(no response)	3

As shown in Table 4, usage pattern number 34 (EICLSup = 34 = ac(accommodation) and ac(accommodation) and as(assimilation)) was the dominant learning style usage pattern that was applied by university educators, *overall*. Within the 20 distinct learning styles usage patterns that were indicated in the data, six university educators applied the usage pattern of 34. These patterns showed various types of pattern usage across the five disciplines included in the study: fine arts, business, education, science, and arts (social sciences). The second most applied usage patterns were EICLSup = 31 = ac(accommodation) and ac(accommodation) and ac(accommodation), and EICLSup = 55= ac(accommodation) and c(convergent) and as(assimilation), which were applied by four university educators each. These data are significant for two reasons: the overall usage pattern for all participants was identified as EICLSup = 34, which is also supported by these numbers; and the second most applied usage patterns were 31 and 55, which included the dominant learning style of 'accommodation' in four out of the six usage patterns used within a lesson framework.

Five other usage patterns were applied twice within the study population, as shown in Table 4. Usage pattern 61 included three participants who provided 'no response' in one or more categories of the inventory. Given the different types of usage patterns applied, the data suggested that university educators applied diverse types of patterns when determining their instructional choices. However, there was a core usage pattern that was applied by educators that supported the overall application of the dominant learning style of accommodation.

Quantitative Research Question 4

Within a discipline/specialty, are there common dominant learning styles applied by university educators within the instructional framework of a lesson (development, delivery, and debriefing)?

Understanding the application of university educators in relation to their instructional choices and their teaching discipline/specialty was an important aspect of the study. Knowing how university educators applied their learning styles within the framework of a lesson as they related to each discipline was required to comprehend their teaching approaches and methods. As shown in Table 5, university educators were categorized in five teaching disciplines/specialties: fine arts, business, education, sciences, and arts (social sciences). Business educators represented the highest number of participants within the population 14/38 (36.8%), with frequencies of 4/38 (10.5%) for fine arts and 5/38 (13.1%) for education. The remaining two disciplines comprised of science with 6/38 (15.8%) and arts (social sciences) with 7/38 (18.4%).

Table 5

EICLS Inventory, University Educators' Dominant Learning Styles Within a Lesson Framework—Discipline/Specialty Frequencies

Discipline/Specialty	Frequency	Percent	Cumulative percent
Fine arts	4	10.5	10.5
Business	14	36.8	47.4
Education	5	13.1	57.9
Science	6	15.8	73.7
Arts (Social sciences)	7	18.4	94.7
No response	2	5.3	100.0
Total	38	100.0	

Table 6

*EICLS Inventory, University Educators' Dominant Learning Styles General Usage
Pattern Within a Lesson Framework—Discipline/Specialty Specific*

Discipline/Specialty (*n* = 38)	Common dominant learning style	Common dominant usage pattern
Fine arts: (*n* = 4)	AC=accommodation AC=accommodation C=convergent	32 = (a1)ac and (a2)ac and (a3)c
Business: (*n* = 14)	AC=accommodation AC=accommodation AS=assimilation	34 = (a1)ac and (a2)ac and (a3)as
Education: (*n* = 5)	AC=accommodation AC=accommodation AS=accommodation	34 = (a1)ac and (a2)ac and (a3)as
Science: (*n* = 6)	AC=accommodation C=convergent C=convergent	10 = (a1)ac and (a2)c and (a3)c
Arts (Social sciences): (*n* = 7)	AC=accommodation AC=accommodation AS=assimilation	34 = (a1)ac and (a2)ac and (a3)as
No response: Did not indicate any discipline (*n* = 2)	AC=accommodation AS=assimilation AS=assimilation	30 = (a1)ac and (a2)as and (a3)as

Each discipline/specialty was analyzed for a common dominant learning styles

usage pattern by first inserting the information into the coding system (EICLSup = 3(la

and dls) and then identifying the resulting usage pattern within the Learning Styles Usage

Pattern Table (Appendices E and F). Two groups of disciplines emerged based on

similarities within their learning styles dominant usage patterns. As shown in Table 6,

analysis of the data indicated that there were significant similarities within the

discipline/specialty categories regarding usage patterns. For university educators who

recorded their discipline in the areas of business (*n* = 14/38; 36.8%), education (*n* = 5/38;

13.1%), and arts (social sciences; $n = 7/38$; 18.4%), the common dominant learning styles and subsequently the common dominant learning styles usage pattern indicated the Usage Pattern 34 (EICLSup = 34 = (a1)ac and (a2)ac and (a3)as), as shown in Table 6. These three disciplines aligned with the overall general learning styles usage pattern of the study population (pattern 34; Table 4). This is an interesting outcome, given that when they are combined, the disciplines of business, education, and arts (social sciences) represented the largest group of participants ($n = 26/38$; 68.3%). In comparison to the other disciplines, these three disciplines aligned with the overall usage pattern of 34, while the others indicated a usage pattern of 32 (fine arts) and 10 (science; Tables 5 and 6).

Educators in fine arts and science categories consistently applied the learning style of accommodation (AC) in development of a lesson activity, as well as consistently applied the learning style of convergent in the debriefing activity. However, they differed in the delivery activity, with fine arts applying accommodation and science applying convergent learning styles. As explained by Kolb (1984), the AC learning style can be described as follows: "the greatest strength of this orientation lies in doing things, in carrying out plans and tasks and getting involved in new experiences. The adaptive emphasis of this orientation is on opportunity seeking risk taking and action" (p. 78). The critical change in learning style application during the delivery activity identified a shift in approach between the two disciplines. Educators in fine arts who made instructional choices focused on learning opportunities that involved action and risk taking. As such, the common dominant learning styles of fine arts educators indicated an accommodative

approach to lesson development and delivery, with a shift to the convergent learning style during the debriefing learning activity.

In comparison, the discipline of science indicated a shift in dominant learning style application during the delivery activity, with instructional choices identifying the learning style of convergent. Convergent learning style demonstrated the approach of bringing learning strategies to lesson delivery in the form of problem-solving (Kolb, 1984, p. 77). It is then significant to observe that while fine arts and science deviated in learning styles application during the delivery, educators from these two disciplines approached the reflective activity of debriefing by selecting similar instructional choices overall. This replication of learning styles application identified the need for educators in these disciplines to be constant in their instructional choices when planning a lesson and then when debriefing after the lesson. These similarities suggested that fine arts and science educators began and ended a lesson applying the same dominant learning styles, presenting a critical relationship between these two activities.

In summary, business, education, and arts (social sciences) disciplines indicated the same dominant learning styles usage pattern of 34 when making instructional choices within a lesson framework (development, delivery, and debriefing). In comparison, educators within the disciplines of fine arts (Pattern 32) and science (Pattern 10) indicated that they used differing patterns, demonstrating a shift away from the overall dominant learning styles pattern of 34 (Table 6).

Quantitative Results—Examination of Two Studies

I conducted a previous study in 2010 that sought to identify university educators' learning styles and communication styles as they were applied within a lesson

framework: "The Relationship between University Educators' Communication and Learning Styles." The results of this previous study were published in the following publication: *Media Research: Learning from the Past, Strategies for the Future*, edited by Geneviève A. Bonin and Yorgo Pasadeos, first published in 2013 by Athens Institute of Educational Research (ATINER), Athens. A summary of the research study and its results are included in Appendix G.

There were several and various similarities and differences between the studies, including the sample population, the methodology, the instrument, and the results. The participants from both studies were university educators; however, the 2010 study ($n = 72$) focused on one university and one country (Canada) and this current study ($n = 38$) focused on universities within the United States and Canada. Both studies used the quantitative method and an online inventory to record the responses of educators' instructional choices during a lesson framework (development, delivery, and debriefing). However, in addition to this learning styles inventory, the 2010 study also included an inventory to determine communication styles of university educators within a lesson framework. The instrument that was administered during both studies was the same, except that the 2010 inventory included 18 sets of statements, whereas this current study included 20 sets of statements in the inventory. The additional two sets of statements were added to this current study as a result of participant feedback from the 2010 study. While the number of participants were different for each study, there were critical similarities in the results that indicated validity and reliability of the instrument.

As such, the results (Table 7) indicated a relationship between the disciplines of fine arts and arts (social sciences). While each study demonstrated different dominant

usage patterns between them, what is interesting to note is that in the 2010 study fine arts and arts (social sciences) used the same usage pattern of 34. The same effect was demonstrated in this current study, where fine arts and arts (social sciences) used the same usage pattern of seven. As well, for both studies, the discipline of science indicated the same dominant learning styles during the development and delivery lesson activities. This represented a continuous application of their dominant learning style of divergent (D), which applies problem-solving strategies. This is an appropriate learning style for the discipline of science, given that it is tasked with finding solutions to problems, in general. Regarding the discipline of business, both studies showed that educators selected instructional choices that supported the convergent learning style application when delivering a lesson (a2). This consistency suggested that while business educators applied different learning styles to develop their lessons and then to debrief or reflect on the lesson, the core of the lesson which is its delivery remained constant in both studies. This same phenomenon was evident when comparing the results of the studies with respect to the discipline of education. Both studies applied the learning style of assimilation in the third lesson activity of debriefing or reflecting.

The similarities and consistencies between these two studies indicate that the inventory has demonstrated validity and reliability in its responses. Additional and long term use of the instrument is required to further demonstrate its reliability.

Table 7

Examination of Two Studies: Discipline/Specialty

| Discipline/ Specialty | Current study, 2015 (*n* = 38) | | Previous study, 2010 (n = 78) | | Similarities between studies |
	Common dominant Learning style	Usage pattern	Common dominant Learning style	Usage pattern	
Fine arts (*n* = 4)	(a1)ac and (a2)ac and (a3)c	32	(a1)d and (a2)c and (a3)ac (*n* = 1)	47	
Business (*n* = 14)	(a1)ac and (a2)ac and (a3)as	34	(a1)d and (a2)c and (a3)ac (*n* = 17)	47	Same learning style application for (a2) delivery of a lesson
Education (*n* = 5)	(a1)ac and (a2)ac and (a3)as	34	(a1)as and (a2)as and (a3)ac (*n* = 4)	24	Same learning style application for (a3) debriefing (reflection) of a lesson
Science (*n* = 6)	(a1)ac and (a2)c and (a3)c	10	(a1)d and (a2)d and (a3)ac (*n* = 22)	14	
Arts (Social sciences) (*n* = 7)	(a1)ac and (a2)ac and (a3)as	34	(a1)d and (a2)c and (a3)ac (*n* = 29)	47	

Summary of Quantitative Data

In summary, the quantitative data gathered from the EICLS Inventory (Mazo, 2008) instruments provided insights into how university educators applied their learning styles within the framework of a lesson. There were three critical findings that resulted from these data.

The first finding identified the overall dominant learning style as accommodation, which was applied by educators within all five disciplines that were represented within this study. This finding suggested that university educators, through their instructional choices within a lesson framework (development, delivery, and debriefing), made decisions about lesson planning, lesson lecturing, and lesson reflection that were accommodative in approach. According to Kolb (1984), this learning style approach was adaptive by using problem-solving techniques "in an intuitive trial-and-error manner (Grochow, 1973), and by accessing other's information rather than using their own analytic ability (Stabell, 1973). When examining the role of a university educator, it follows that two of the core functions are to understand the theories, concepts, and ideas of their discipline/specialty and then to disseminate this information to students in a way that accommodates the nature of the information that is included within a lesson framework. The adaptive approach of the trial-and-error learning and teaching technique provided a level of flexibility that suggested the need for both core knowledge and creativity to be shared by the learner/teacher within a lesson framework. This is supported by Vygotsky's (1978) "zone of proximal development," where learner/teacher discovers "functions that have not yet matured, but are in the process of maturation, functions that will mature tomorrow but [were] in an embryonic state, [and which included]…those processes that [were] currently in a state of formation that [were] just beginning to mature and develop" (pp. 86-87). Given that a university educator is first a learner and then a teacher in role, the trial-and-error approach offers adaptability, responsiveness, and reflexivity between their own learning style and its effect on their lesson creation.

The second critical quantitative finding was the similarity of the dominant learning styles usage patterns in relation to the five representative disciplines within the study participants. There was a significant alignment of the dominant learning styles usage pattern of EICLSup = 34 = ac(accommodation) and ac(accommodation) and as(assimilation), which comprised 68.3% ($n = 26/38$) of university educators who applied this pattern during the development, delivery, and debriefing of a lesson. The disciplines of education, business, and arts (social sciences) reported this pattern as their dominant learning style usage pattern, which also supported the overall application of the accommodation dominant learning style. This suggested that there was a common learning style application across the majority of the

The third critical quantitative finding indicated that the majority of university educators were consistent in their application of the accommodation dominant learning style during the development and delivery activities of a lesson; however, they made a shift when transitioning from delivery to debriefing. There was a clear delineation and different approach to this third instructional activity, which identified the roles of reflection, consideration, and review within this final part of the framework.

These three findings were further supported by the qualitative in-depth interviews that were conducted in order to obtain a deeper and clearer understanding about the instructional choices educators reported in the EICLS Inventory (Mazo, 2008). The following section provides detailed results about the qualitative interviews with seven university educators, as they explained, described, reflected, and considered their learning styles in relation to their instructional choices.

Qualitative Results

Qualitatively, this study conducted in-depth interviews with university professors where they provided their reflections on their instructional choices in relation to their learning styles. Data underwent a comprehensive content analysis, using Krippendorf's (2012) method. According to Wolfer (2007), content analysis can be used quantitatively or qualitatively, depending on the data gathered. Given that this current study employed a mixed methods approach and a sequential explanatory design, the quantitative content analysis used the counting of the "appearances of predetermined themes or words" (p. 382). Regarding the qualitative content analysis, analysis was based on the "subjective meanings or interpretations to the content" that were derived from within the text (p. 382). Further to Wolfer's understanding and perspective of content analysis, the following statement regarding triangulation and mixed methods supported the importance of conducting both quantitative and qualitative content analyses of a study. "As with other methods of observation, purely quantitative or purely qualitative methods are limited in specific ways, whereas a combination of the two will produce a more comprehensive, valid and reliable analysis" (p. 382).

Krippendorf's Content Analysis Method

To provide structure and to facilitate the process, Krippendorf's (2012) content analysis method was employed: (a) unitizing (individual university educator), (b) sampling (seven university educators' interview transcripts), (c) recording/coding (employed Neumann's (1997) four types of coding systems; developed a codebook), and (d) analysis (identified themes and commonalities within the texts). Krippendorf's (1980) framework for content analysis was used to identify and provide context, meanings, and

evidence for the four themes extracted from the interview transcripts. His content

analysis method is described below in relation to this current study.

Unitizing. The unit of examination for this study was the university educator.

Sampling. University educators from the United States and from Canada

participated in Part I: Inventory of this study. From this sample, seven university

educators agreed to participate in the in-depth interviews (Part II), which shaped the

qualitative method of this study. Table 8 provides information about the participants. The

transcripts from these educators were used as the samples for the content analysis.

Table 8

Interviewed Educators: Descriptive Statistics

Participant case	Gender	Age range	Teaching years	Discipline
Case 7 (DKW) United States	M	56-65	4	Public policy/ Business
Case 8 (LW) United States	F	46-55	18	Higher education/ Education
Case 9 (WR) Canada	M	56-65	25	Music/ Fine arts
Case 10 (BR) Canada	F	46-55	12	Music history/ Fine arts
Case 12 (TKS) United States	M	46-55	4	Management/ Business
Case 19 (AS) Canada	M	46-55	18	Business/ Business
Case 24 (DC) Canada	M	66-OL	44	Philosophy/ Arts/Social sciences

Recording/coding. The interviews were audio recorded and then transcribed into

a text document for coding. Then the text was entered into the QDA Miner (Provalis

Research, 2015) software to develop a code book of frequencies, critical words, concepts, and phrases. Neumann (1997) identified four types of coding schemes: frequency (count of a word or phrase occurs), direction (measures that address topics or issues based on positive/negative or support/not support), intensity (measures the strength and power of a topic or issue), and space (measures how much space is used to explain a topic or an issue based on space on a page or time in an interview). This study employed all four schemes when analyzing the content of the interview transcripts.

Table 9 provides a list of the word categories, codes, and descriptions, as well as the number and percentage of words where these categories and codes were included within the transcript texts. Using the three groups of the instructional framework of a lesson (development, delivery, and debriefing activities), category/code examples were identified and applied to the textual content of the transcripts. Core concepts were recognized as key words that were repeatedly expressed by participants when they were expanding and explaining their responses recorded in the EICLS Inventory (Mazo, 2008). Development of a lesson activity included keywords that comprised *theoretical* information, which was considered foundational to the student's learning needs. As part of the lesson development process, educators used theories in a lesson to establish important conceptual frameworks that were incorporated and integrated into the lesson plans; theories shaped the delivery of a lesson. Student-centric learning approaches influenced the lesson planning activities, with the thought process focused on student learning.

In the delivery of a lesson activity, the concepts of *learning* and *critical thinking* were identified when educators were engaged in lesson content dissemination. Types of

thinking applied within the lesson delivery included problem-solving and solution-based approaches, as well as discussion-based lectures that were supported by anecdotal stories and original and creative exploration of ideas and concepts. Educators identified listening and reading as crucial to lesson delivery (e.g. listening to instructions or reading aloud). Additionally, written and verbal expression by both faculty and students were key concepts applied by university educators when describing their lesson delivery activities. Speech and articulation of ideas characterized the importance of discussion and idea generation in support of originality and creativity.

When debriefing a lesson, university educators indicated a clear application of *reflection*. Reflection and *making sense* of a lesson were critical to the review that educators performed in order to comprehend the nature and effectiveness of their lesson delivery. In Table 9, the majority of interviewed educators considered debriefing as critical to the success of the first two lesson activities (99.8%). As well, educators stated that making sense of lesson content connected all three lesson activities, but was most consciously performed during debriefing. Reflection on learning and teaching approaches allowed for contemplation on one's understanding of his/her own learning style and how it influenced lesson activities.

Table 9

Educator Interview Transcripts: Categories/Codes Identified Within a Lesson Framework (Development, Delivery, and Debriefing)

Category	Code	Description	Number of words	Percentage of words
Development of a Lesson Activity (Questions 1-4)				
Situation	Situations	Various learning situations that occur during lessons	37,521	99.8
Student	Student-centric	Lessons focused on the student's needs	28,620	76.1
Theories	Doctrine	Doctrine gives you the general framework but not the practice	30,333	80.6
Theories	Theory	Employ theories during lesson development and debriefing	37,521	99.8
Delivery of a Lesson Activity (Questions 5-16)				
Learn	Critical thinking	Application of critical thinking in the learning process	37,521	99.8
Learn	Learning	The act of learning during lesson development and delivery	37,521	99.8
Learn	Real life	Real-life connections in lesson learning	28,620	76.1
Learning styles	Learning style	Kolb's four learning styles	37,521	99.8
Lesson	Class and lesson structure	The framework of a class or lesson that is being taught: development, delivery, and debriefing	30,333	80.6
Listen	Listening	The use of "listening" in development and delivery activities	37,521	99.8
Read	Reading	Use of "reading" in lesson development and delivery activities	30,333	80.6
Thinking	Types of thinking	Different types of thinking used within a lesson	37,521	99.8

(*table continues*)

Category	Code	Description	Number of words	Percentage of words
Verbal	Verbal expression in a lesson	The act of educator and students verbalizing information in a lesson framework	37,521	99.8
Writing	Writing in lesson framework	Educator and student writing in lesson development, delivery, and debriefing	37,521	99.8
Debriefing of a Lesson Activity (Questions 17-20)				
Debrief	Reflect	A way to debrief a lesson after it has been delivered	28,620	76.1
Reflection	Debriefing	To reflect on the lesson that was delivered	37,521	99.8
Reflection	Reflection in lesson	How educator and students use reflection in the lesson	37,521	99.8
Sense	Make sense	To make sense of an idea or concept	30,333	80.6
Other categories/codes				
EICLS Inventory	Inventory	EICLS Inventory	28,620	76.1
Post-secondary learning	University	The university learning experiences the participant encountered	30,333	80.6

Analysis. The interview transcript text was entered into the QDA Miner (Provalis Research, 2015) software for analysis. Quantitative content analysis included frequencies of words and word clusters. Qualitative analysis included variables, codes, and word definitions that supported understandings of meanings within the transcripts. Frequency of critical keywords, concepts, and phrases were analyzed and measured based on Neumann's (1997) four types of coding systems (frequency, direction, intensity, and space).

Content Analysis Frequency of Words

Table 10 provides the frequencies of critical key words and word clusters that were identified within the interview transcripts of the university educators. This process applied Neumann's (1997) first and second coding processes (frequency and direction).

As shown in Table 10, it was observed that the frequency of words and word clusters provided significant evidence of the direction that university educators chose when discussing, explaining, and expounding on their learning styles choices within a lesson framework. The most frequently used words that were employed by educators to describe and to articulate their instructional choices during lesson planning included *sense*, *looked*, *view*, *perspectives*, and *perceive*. These words indicated a combined frequency of 1385 instances where they were used to describe instructional choices and 222 different cases found within the interview transcript texts. This was also evident in the second word cluster of *teaching approaches*, where 1289 instances were found that included the words of *discussions*, *seminar*, *values*, *rule*, *originality*, *pace*, *organize*, *creativity*, and *techniques* and 304 cases were identified within the interview transcript texts.

Table 10

Participant Interview Transcripts: Frequencies of Words/Word Clusters

Word/Word clusters	Frequency	Number of cases	Percentage of cases	Cluster: Instructional activity
Views: sense, looked, view, perspectives, perceive	1,385	222	74.0	Development delivery
Teaching approaches: Discussions, seminar, values, rule, originality, pace, organize, creativity, techniques	1,289	304	35.6	Development Delivery
Teaching resources: PowerPoint slides, resources, midterm/exams, repertoire, tutorial, chart	968	204	26.1	Development Delivery
Verbal learning: Told, stories, narratives, storytelling, anecdotes, speech, communication	930	234	36.6	Delivery
Knowledge base: Knowledge, knowing, understanding, experts, information	791	221	44.4	Delivery
Roles: Role, professor, instructor, moderator	775	229	46.0	Development Delivery Debriefing
Application: Apply, applies, application, applying	655	184	64.7	Development Delivery Debriefing
Reflection: Reflect, reflective, reflections, meditation	550	158	44.5	Debriefing
Theory: Theories, philosophy, doctrine	482	86	40.3	Development
Reading: Read, vocabulary	433	71	50.0	Delivery

(*table continues*)

Word/Word clusters	Frequency	Number of cases	Percentage of cases	Cluster: Instructional activity
Thinking: Thinking, discussions, critical thinking, critically	420	105	49.3	Development Delivery
Solutions: Problem, solving, solution, engage	411	121	56.8	Delivery
Lecture	396	56	78.8	Delivery
Learned	261	51	71.8	Development Delivery
Situations: situation, atmosphere	246	71	50.0	Development Delivery
Choice	160	50	56.3	Development Delivery Debriefing

When combining data from these two word clusters, there is substantial support for the quantitative data recorded within the EICLS Inventory (Mazo, 2008). This is evident when reviewing the overall dominant learning styles pattern for all participants which is the EICLS Usage Pattern 34 = ac and ac and as (see Table 4). The accommodation learning style was applied by 68.3% (n = 26/38) of all participants in the study. As explained by Kolb (1984), this style required that the individual learner be engaged in doing things, in developing plans and activities, in seeking opportunities that needed action, and in being prepared for fast changing circumstances (p. 78). Based on these two word clusters and in relation to the description of accommodation, words used by educators such as *discussions* and *seminar*, supported the characteristic of being engaged in doing things, words such as *organize*, and *creativity* supported the activity of

creating plans and tasks, words such as *sense*, *looked*, and *view* indicated that learning

opportunities need to be acted upon, and words such as *pace*, *perspectives*, and *perceive*

explained that changing environments and understandings of circumstances required

immediate accommodation as they were being presented. All of these word frequencies

and teaching directions demonstrated a well-developed scaffold that aligned with the

dominant learning style of accommodation. As such, this triangulation of quantitative

and qualitative data was foundational to understanding the relationship that exists

between educators' learning styles and their consciously reflective instructional choices

made within the framework of a lesson (development, delivery, and debriefing). This

indicated a positive reinforcement between the EICLS Inventory (Mazo, 2008)

responses and the university educators' reflections and explanations on their

instructional choices.

The intensity, which measures the strength and power (Neumann, 1997) of these

words and word clusters, also provided critical indicators within the interview transcript

texts. While the strongest frequencies and directions are shown in the first two word

clusters in Table 10 (Views and Teaching approaches), there are other word clusters that

indicated intensity through power and strength. The word cluster of *verbal learning*

demonstrated a combined frequency of 930 instances with 234 cases found within the

interview transcript texts. Based on educators' word usage, there is a conscious use of

narration within the delivery of a lesson activity that indicates an intensity of ideation

through speech, storytelling, anecdotal information, and verbal communication. The

intensity of word usage and combinations of words continued within the clusters of

knowledge, which included expressions such as *knowing*, *understanding*, *experts*, and

information. This cluster suggested that knowledge and content were critical to the

development and delivery of a lesson. As such, the importance of an efficient and

effective transition of knowledge from the development of a lesson activity to the

delivery of a lesson was demonstrated through the educators' general learning styles

usage pattern (34), which indicated that the majority of educators consistently applied an

accommodation learning style in both activities. The interview transcript texts supported

the EICLS Inventory (Mazo, 2008) responses in its identification of educators' general

learning style usage pattern of 34 (accommodation and accommodation and assimilation).

Educators' application of this pattern (34) was further substantiated when examining the

word clusters of *roles*, *application*, and *reflection* (Table 10). The roles that an educator

fulfills are various (professor, instructor, and moderator) in relation to the lesson

framework (775 instances, 229 cases within the interview transcript texts). The high

frequency of mentions of these roles when discussing a lesson framework indicated a

high intensity regarding the importance of an educator's roles as they are performed

throughout the development, delivery, and debriefing of a lesson. This intensity was also

furthered through the use of words such as *application* and *reflection*. These two concepts

were communicated significantly when educators explained and expanded on their

instructional choices within a lesson framework. Application of teaching roles,

techniques, and reflective practices provided insight into the inventory responses. As a

concept and practice, reflection was more consciously considered and applied during the

third activity of a lesson, which was debriefing. This substantiated a relationship between

the general learning style of assimilation that was applied by participants when reviewing

the lesson after its delivery to students and the conscious instructional choices recorded in

the inventory. The words *reflect*, *reflective*, *reflections*, and *meditation* were included in the educators' transcript text represented in a combined total of 550 times. The meaning and application of this concept was substantial and supported the assimilation learning style during the debriefing activity. Assimilation learning applies adaptation as a critical characteristic, which supports the concept of reflection (Kolb, 1984, p. 78). The act of reflection and meditation enabled the educators to adapt and assimilate short and long-term changes to the lesson as it occurred and as it will occur in future iterations of the lesson.

Of Neumann's (1997) four coding processes, *space* presented important indicators regarding the conscious application of learning styles within the framework of a lesson (development, delivery, and debriefing). Within the interview transcript text and time intervals, there were substantial time periods during the conversation that were tangential to the key words, concepts, and word clusters. These time periods translated to numerous pages in the interview transcripts that were dedicated to the explanations of the concepts of *views*, *teaching approaches*, *teaching techniques*, *verbal learning*, *application*, and *reflection*. Table 11 provides details regarding the time and space allocations for each concept, word, and word clusters that were frequently and significantly identified by educators during the one-on-one interviews where they described and expanded on their instructional choices. Most notably, considerable time was allocated to the critical areas of *perspectives*, *verbalizing*, and *reflection*.

Table 11

Interviewed Educators: Time and Space Allocations for Key Concepts Applied During a Lesson Framework

Participants All cases	Time allocation (minutes)	Page space allocation (pages)
Teaching approaches	140	28
Teaching resources	120	21
Verbal learning	20	5
Knowledge	25	4
Roles	17	4
Application	85	18
Reflection	77	11
Theory	40	15
Reading	15	5
Thinking	68	10
Solutions	60	10
Lecture	12	3
Learned	27	8
Situations	87	12
Choice	20	5
Total		

Time and space allocations for key concepts. As shown in Table 11, time and space allocation provide details about how much time was allocated in the university educators interviews in relation to the key concepts being discussed. As noted, teaching approaches and teaching resources were concepts that were discussed using the most time in the interview and subsequently using the most page space within the interview transcripts. This is important to understand, because this measure indicated the level of importance for each concept and how often and how long educators were willing to expand and provide details on the specific topics.

Content Analysis Phrases and Meanings

In order to acquire a deeper and in-depth understanding of the meaning of the interview transcript texts, the analysis of the content required further examination. As such, specific phrases and their explanations were analyzed for meaning and context as they related to the educators' expanded descriptions of their instructional choices as they related to the framework of a lesson (development, delivery, and debriefing).

Phrases from the participant interview transcript texts were reviewed, categorized, and analyzed for salient words, definitions of words, word clusters, and meanings. The texts were analyzed using QDA Miner (Provalis Research, 2015) software to organize the data. Table 12 provides details of the analysis of the transcript texts. Excerpts from the interview transcriptions derived from the different participant cases and demonstrated how the educators selected their conscious instructional choices, as well as how they articulated the meaning of these choices in relation to their teaching and learning approaches. In some cases, the excerpts also provided examples of when these educators realized the connections and relationships between their personal learning styles application and how they were applied during a lesson framework (development, delivery, and debriefing).

Table 12

Participant Interview Transcripts: Word/Concept, Word/Concept Definition, Supporting Text and In-Context Meanings Within a Lesson Framework (Development, Delivery, Debriefing)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
Case 7	Thinking	Different types of thinking used within a lesson framework: critical, situational, multi-dimensional, higher order, point of views, perspectives, my thinking and my approach, black and white thinking, grey thinking, counter argument, cognitive bias, argument	Case 7: You chose a) organize my LESSON content around problem-based LEARNING (C)	The goal in the classes that I teach, whether it is CRITICAL THINKING, non-profit, PUBLIC policy, PUBLIC-administration, grant WRITING, and organization development, that my goal is for a student to walk away with the ability to apply what they learned in their lives the next day. So, if they have SITUATIONS in models and theories and real-life applications they will be able to become problem-solvers. Really, that relates back to being student-centric in my teaching approach by allowing them to become problem-solving because it is not the content or the information as they can always look that up or they can always research but it is the application, the higher order CRITICAL THINKING. I chose a) because it was the closest that represented it for me.
			Case 7: You chose b) I feel that I have considered all of the content from various PERSPECTIVES (D)	Well, the most challenging part of my teaching adults is to teach them about COGNITIVE BIAS and all the different types of bias. Not to change their conclusion but to have them look at the same facts from different PERSPECTIVES. To have a counter ARGUMENT so that it strengthens and have them understand their conclusion and their

(table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
				understanding by examining both sides. And, being able to take their bias and being subjective and put it on the side, and when I have the ability to show them a DIFFERENT POINT OF VIEW, a different SCHOLAR, a different THEORY; if it is conservative and liberal, if it is a THEORY vs another, it gives them the ability to understand the content and being able to justify what they are ARGUING, whether it is a DISCUSSION or a PAPER they are WRITING.
			Case 7: You chose d) providing opportunities for students to ENGAGE in new experiences needing action (AC)	Yes, the choices are all part of MY THINKING AND MY APPROACH, but selecting the opportunities for students to ENGAGE in new experiences requiring action is really based on you know an action base approach.
Case 9, 10, 24	Debrief, Reflect, Reflection, Reflection in a lesson	A way to debrief a lesson after it has been delivered; to reflect on the lesson that was delivered; how educator and students use reflection in the lesson: reflection, ponder, review, consider, contemplate, compare, wonder, debrief, question, examine, interrogate, probe; change of mind, need to know, insights, writing, time, tangents, watching	Case 9: So, do you give them; I know you prompt them, but do you have any systematic approach? Like do you have specific questions that you use to bring them deeper?	Yeah. I haven't actually thought about that. But, I am sure that it happens. Yeah, again, depending on what course it is, and where I am at the TIME. But, I know with the keyboard ensemble (master classes); with those courses I can dump content sometimes because of some kind of DISCUSSION that has started in the CLASS where I REALIZE people LISTENING and truly REFLECT and maybe moving forward with this much more quickly than I can deliver the content. Which is sort of a good thing. Yeah. But, there are some key questions. (table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
			Case 9: You chose c) REFLECTING on the general delivery of the LESSON to ensure its approach was logical and precise (AS)	So, because plan A is usually out the window, its plan B or plan C to REFLECT back. What worked? Then that is my new plan A. I do not WRITE a lot of stuff down. It tends to be all through the assignments and handouts. I have a great memory on how that went, yesterday. And, how that went a year ago. So, you just start seeing similar things. The REFLECTION TIME after is that "was that a complete waste of TIME for them?" or "can I move on?"
			Case 10: Statement 17: I REVIEW after a LESSON by… You selected a) WRITING down on what worked and what did not work for the students.	I would SAY, c) and d) also apply. But, I do WRITE myself little notes, especially if it was very successful, I WRITE myself a little note. And, especially if it backfired, then I have actually been known to WRITE myself little notes and I will SAY: make sure you change this next year, or this really backfired, student cried in CLASS, which is the worst thing that could possibly happen. Just to be warned. I especially very much aware of how a syllabus is being created.
			Case 24: So were role models very important for you when you were LEARNING yourself?	I wanted to be like certain people whom I thought were, I don't even know what words I would have used. Now I would SAY serious or REFLECTIVE or decent. I used this as an example one TIME with some…
Case 24	Theories, Doctrine, Philosophy	Doctrine gives you the general framework but not the practice; to employ or use theory/theories during lesson development, and	Case 24: Statement 1: When I choose content for a LESSON, I like to… You had no response for this one, did you want	I can tell you two responses. Two possible responses; one is, I teach Political PHILOSOPHY in a political science program, where in the first case students (table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
		debriefing activities: theory, doctrine, framework, not the answer, conceptual ideas, philosophy, model, idea, principle, belief, question	to REVIEW them or add perhaps a different response?	are scared like crazy of it because they THINK it's going to be hard or like mathematics so the more junior levels I invest heavily in bringing them out of that. Even so, the classes I teach are likely to be classes on, SAY, Heidegger, or Aristotle, or contemporary theories of justice. So my first task is to get the students to understand what it is they're READING, and my main objective in that is to get them to trust their understanding, so that they can, then I want them to play with it, I want them to criticise it, I want them to COMPARE it to how they feel, what they SAY, what other people SAY. So that just didn't fit in there. The other thing is, my sort of mantra is, the number one QUESTION is: "What's the point of that CLASS?" If people are going to spend 50 minutes or 3 hours, what's the point?
			Case 24: Statement 5: My approach to teaching a LESSON generally focuses on	Yeah, well that's what I'm looking for but the way I get there first is if it's difficult THEORY, you have to TALK about the THEORY for a while. And the REASON you have to TALK about the THEORY is they will be WRITING all this down. I usually forbid them to take notes and then do that. On the ground, like, you know this, what I'm doing is creating a FRAMEWORK for questions. That's all. But it's really just to fill up the first little while when people are relaxed, you're kind of looking and waiting for things but there is this material they've got to cover and particularly if you're doing classical THEORY, you know a 17th century Englishman's stuff (table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
				doesn't translate to today very well so that's why I kind of went to F. Sort of trying, first of all, to show them how they could relate internally to the material and in a SENSE translating it a little bit for them but then with the view to turning them loose on it
Case 7, 9, 10	Verbal, Verbal Expression	The act of educator and students verbalizing information in a lesson framework: debate, discussion, argument, arguing, social media, storytelling, stories, dialogue, interaction, social learning theory, conversation, talk, speech, verbalizing, say, oral traditions, movies, anecdotal	Case 7: Statement 11: I outline the content that will be covered during the LESSON by	WRITING on the board is not teaching or educating. VERBALIZING it at the beginning of a LESSON; I THINK that there are best practices that say "WRITE it on the board" "this is what you are going to LEARN" You SAY IT AGAIN. But, what I like to do is to weave the essential questions and to bring them back of how things tie in together and that goes back to that multi-disciplinary approach. And, there are times I felt every CLASS that I go off on TANGENTS, but I will always bring it back to the QUESTION to that topic and show you how it ties together. And, I understand how I teach and go off on TANGENTS, but I also have had practice of bringing it back." And so students get it. They get it through painting pictures and STORYTELLING. That is why for thousands of years that ORAL TRADITIONS or STORYTELLING of how we LEARN, it is in our DNA of how we LEARNING through STORYTELLING and why we love to go to MOVIES and WATCHING and LISTENING to music and READING books and TEXTING each other. We love to HEAR STORIES. And, (table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
				we get engaged in them. So, but you have to weave it around the ESSENTIAL QUESTION.
			Case 9: Do you use personal ANECDOTAL CIRCUMSTANCES from the students themselves? Is that something that you would draw upon?	When we do discussions, as well, one of the DISCUSSION STYLES I use all of the TIME is that I will pair them up and I will SAY to them: "Okay, now you will tell this person what you have READ and then the other person is going to summarize it in front of the other person and then you are going to ask this person whether you were happy with the summary. And, the do what is that about. And, I go: "that is when you summarize something you said and I know you have READ and the author is not there to SAY: "wait a minute, you got that wrong." You have to be careful. Some people remember this, other people go: "yeah, right".
			Case 10: We are so focused on auditory senses. Like music is so where all senses are involved. But, because we are so reliant on our ears, it is so important to communicate in a way that involves LISTENING and then responding. So, LISTENING is the first step. And, we practice that all the TIME.	
Case 10, 24	Writing, in a lesson framework	Educator and student writing in lesson development, delivery, and debriefing: writing examples, notes, scholarship, paper, hands on exercises, metaphor, abstract, APA style, write, PhD, Masters, texting	Case 10: You selected a) WRITING down on what worked and what did not work for the students.	I would SAY, c) and d) also apply. But, I do WRITE myself little notes, especially if it was very successful, I WRITE myself a little note. And, especially if it backfired, then I have actually been known to WRITE myself little notes and I will SAY: make sure you change this next year, or this really backfired, student cried in CLASS, which is the worst thing that could possibly happen. Just to be warned. I especially very much aware of how a syllabus is being created. If I need to make major changes, the comment box will be right in the syllabus: that (table continues)

Case #	Word/ Concept	Word/Concept definition	Salient/ Supporting text and/or phrases	Educator's meaning/ Explanation of text phrase
				didn't work, you need to change this the next TIME, or people didn't understand a slide.
			Case 24: You selected WRITING down what worked and what did not work	The first thing I do is I go for a walk or something and THINK about it. I almost always feel badly because it didn't work. And then I go: What did work? What sorts of things did work? Ok. And I don't have to do this so much with classes that I taught a whole lot because I just need to make a one line not. But I used to after every 3 hour CLASS, make a couple of NOTES on what worked and what didn't and when I would finish a section, make a full page of NOTES.
Case 9	Learning styles	Personal learning styles as an educator. Kolb's four learning styles: convergent (C), divergent (D), assimilation (AS), accommodation (AC)	Case 9: How your teaching style is based on your learning style.	It is interesting. I have been actually THINKING about that QUESTION from you. How much of your teaching STYLES is based on your LEARNING STYLE or *your experiences as a learner*? I THINK that I REALIZE that there are a lot of other things in life that came to that. *So, if I put myself in the chair as a student.* I have been guilty of this, looking at an instructor as if he is talking for a long TIME, I know how tough that can be. For some, they are very patient and can handle it, but from an instructor point of view, you don't really know what they are LEARNING.

Overview of the Content Analysis Themes

The following text analysis findings for qualitative data were organized by the three themes that this study examined: shifts in learning styles application as they relate to a lesson framework, adaptation of educators' learning styles applications, and reflections on how educators' learning styles are applied within a lesson framework. These themes were identified and extracted from the participant interview transcript texts and were guided by the EICLS Inventory (Mazo, 2008) statements and the qualitative research questions for this study.

Theme 1: Shifts in Learning Styles Application as They Relate to a Lesson Framework

The shifts in learning styles as they were applied within a lesson framework (development, delivery, and debriefing) were significant between the three lesson activities. Based on the EICLS Inventory (Mazo, 2008) results relating to shifts in learning styles application within a lesson structure and subsequently usage patterns, the following Table 13 provides a summary of the seven interviewed university educators' learning styles as they were applied during the three lesson activities: 1) development, 2) delivery, and 3) debriefing. Additionally, the university educator's individual dominant learning styles application usage pattern is listed to demonstrate shifts in the learning styles as the educator transitioned from one activity to the other.

Table 13

Interviewed Educators' Learning Styles Usage Patterns to Demonstrate Shifts in Learning Styles Application Within a Lesson Framework

University educator participant Case	Dominant learning style (development)	Dominant learning style (delivery)	Dominant learning style (debriefing)	Dominant learning style usage pattern
7 (DKW) Business	Accommodation (AC)	Accommodation (AC)	Assimilation (AS)	34
8 (LW) Education	Accommodation (AC)	Accommodation (AC)	Divergent (D)	33
9 (WR) Fine arts	Accommodation (AC)	Accommodation (AC)	Assimilation (AS)	34
10 (BR) Fine arts	Divergent (D)	Convergent (C)	Convergent (C)	8
12 (TKS) Business	Accommodation (AC)	Accommodation (AC)	Assimilation (AS)	34
19 (AS) Business	Accommodation (AC)	Convergent (C)	Assimilation (AS)	55
24 (DC) Arts/Social sciences	Accommodation (AC)	Assimilation (AS)	Convergent (C)	56
Dominant learning style combined	Accommodation (AC)	Accommodation (AC)	Assimilation (AS)	34

Development of a lesson activity. Five out of seven of the educators applied an accommodation learning style during the development of a lesson activity. This supported the quantitative data recorded in the EICLS Inventory (Mazo, 2008) for questions 1-4 that focused on the conscious instructional choices educators made regarding the activities comprising the creation of lesson plans, lesson content, and lesson materials.

Given the characteristics of these two learning modes within the accommodation learning style (concrete experience and active experimentation), university educators provided in-depth narratives and expressions that sustained the EICLS Inventory (Mazo, 2008) responses they recorded within the development of a lesson activity. Evidence within their dialogue demonstrated the need to accommodate their learning and teaching development activities by including practical and dynamic applications of knowledge through pragmatic decision making about lesson plans and creating active exercises that can be used with the delivery of a lesson. During their interviews, four university professors demonstrated how the dominant learning style of accommodation was applied in lesson development.

Based on the EICLS Inventory (Mazo, 2008) statement 1 response: When I choose content for a lesson, I like to include situations and examples that go beyond theory and apply in different and changing circumstances (Accommodation (AC)), university educators Cases 7, 8, 9, and 24 identified, explained, and described their reflections regarding the importance of being mindful about changing circumstances in a lesson. Therefore, when selecting content, these educators were conscious of including examples that reached beyond theoretical underpinnings of a concept or construct being

taught. For example, university educator Case 7 stated the following about accommodating the changing circumstances that he encountered when teaching:

> Learning is a process and during that process it is non-linear and it crosses disciplines and different topics. So, I like to have real live situations that create critical thinking and problem solving opportunities that are appropriate to individual student learning needs and their learning outcomes, and their professional goals. So, by having situations and examples that go beyond theory and apply in different and changing circumstances allows me to be very student-centric when I choose content.

This university educator sought to accommodate learning at the point of lesson development—learning that supported both the educator's and students' circumstances that could potentially occur during lesson delivery. The awareness to accommodate learning was further supported by three other educators, all of whom described and articulated the requirement to place themselves within the context of the lesson as they were engaged in selecting content and making instructional choices for the lesson delivery. University educator Case 8 explained that she wanted to ensure students understood the importance of theory and practice as separate entities, but also emphasized the critical relationship between the two, stating that both needed to be taught as they informed one another and supported the educator's and student's understandings of the lesson content. Additionally, this participant clarified that theory and practice hold equal value when teaching a lesson. University educator Case 9 supported the salience of going beyond theory in a lesson, identifying the importance of theory being applied dynamically and not using a *cookie cutter* approach. However, university educator Case

24 reflected on this question from a more personal perspective, identifying how the professors who taught him as a student made the experience of learning enjoyable because he was drawn to the way his professors taught a lesson—there was a sense of sameness and likeness that enabled him to connect with his professor. As such, this connection offered role models for learning and teaching, which also presented a role model and insight into how a professor applied learning and teaching styles within a lesson framework.

Based on the EICLS Inventory (Mazo, 2008) statement 3 response: When I choose materials for my lesson, I…d) include descriptions of real-time events and circumstances where students can engage in situational thinking and discussion (Accommodation (AC)), university educator Case 7 outlined the critical importance of providing real-time circumstances for students in order for them to experience a lesson through the direct perspectives, knowledge, and practice that he brought to his lectures. "Students can then take scholarship, practice, research, and application of problem-solving and being able to engage when situational thinking that is a multi-dimensional way of thinking." Collaboration, discussion, and real-life examples and experiences were practical ways of demonstrating how the accommodation learning style was applied by this educator during the development of a lesson activity.

Analysis of participants' comments in development of a lesson activity. All participants described how they applied the accommodation learning style within the development activity of a lesson framework by including examples, by being aware of changing circumstances, by understanding that learning is non-linear, by being cognizant of the connection between theory and practice which accommodates learning, and that

learning crosses disciplines. More specifically, university educator Case 7 explained that "theory has to have practical application and the situations are often dynamic." This description provided insights into the importance of thinking and including theory and practical applications of a concept at the development stage of a lesson. The need to consider how information is organized and prepared before its delivery is critical to the successful dissemination within the classroom.

University educator Case 8 identified the relationship between theory and practice, describing the process of learning as one that accommodates both activities and that supports the complexity of this type of learning. This suggested that both theory and practice should be accommodated in the first lesson of activity (development) to ensure that lesson preparation included these two critical activities—accommodation of both theory and practice was explained as being essential to organizing and creating the foundational groundwork for the second lesson of activity (delivery).

University educator Case 9 expressed the need to go beyond theory by being dynamic in the classroom. This exemplified the characteristics that Kolb (1984) described about the accommodation learning style, which included real life situations in changing circumstances that required adjustment and accommodation of learning (p. 78). University educator Case 9 clearly related to the characteristic of the accommodation learning style by demonstrating flexibility in lesson development through the inclusion and range of content from historical to contemporary musical situations. This educator understood the importance of being prepared for changing circumstances in a lesson by preparing the lesson for discussions that support this type of learning—an accommodation of learning through access to extensive content.

Further to the educators' dominant learning style of accommodation, university educator Case 24 indicated the importance of being prepared for any circumstance and situation in the lesson. As such, this educator articulated how using the approaches of previous professors that supported his learning style, was his starting point. Upon reflection, this educator explained the learning relationship that he initially observed, recognized during his own university studies, and then mirrored these approaches and characteristics in his own teaching style: "I certainly started teaching the way I was taught by professors, whom I like, I mean when the experience was enjoyable." However, this educator explained that as a learner (student) there is the need to connect with the professor, "maybe not consciously" (p. 420) that the learner senses a common bond in learning that draws him to the professor. This suggested that learner and professor may connect through similar learning styles within a lesson. In relation to this educator's reflection about similarity of learning styles, it is a significant observation that supports the link between the university professor's application of his learning style and the student's recognition of similarity of learning style and patterns—first, I am a learner, then I am an educator.

Delivery of a lesson activity. As educators transitioned from development of a lesson to the second activity of lesson delivery, data from the EICLS Inventory (Mazo, 2008) indicated that the accommodation learning style continued to be the dominant learning style of educators. This was the overall dominant learning style of the combined participant educators during the delivery of a lesson activity. When examining the transcripts of the seven educators who were interviewed, the data supported this result, with four out of seven educators applying the accommodation learning style. The

majority of the educators demonstrated the key adaptive emphasis of this style, which is to acclimate to changing and immediate circumstances when teaching. University educator Case 7 provided a salient example of how he accommodates the content that is covered within his lecture:

> But, what I like to do is to weave the essential questions and to bring them back of how things tie in together and that goes back to that multi-disciplinary approach. And, there are times I felt every class that I go off on tangents, but I will always bring it back to the question to that topic and show you how it ties together. (university educator Case 7)

There is a clarity of purpose in the way that this university professor approached the delivery of his lesson, cognizant of accommodating the flow of his teaching based on and in conjunction with the content and the critical question that are combined at the end of the lesson, with space, time, and contingency to adjust as the lesson progresses. This is a dynamic and distinct representation of applying the accommodation learning style within the delivery of a lesson activity.

The other three educators deviated from the overall dominant accommodation learning style, with two indicating the convergent learning style as their dominant style during the delivery of a lesson activity. The convergent learning style "relies primarily on the dominant learning abilities of abstract conceptualization and active experimentation. The greatest strength of this approach lies in problem solving, decision making and the practical application of ideas. Learners prefer dealing with technical tasks and problems rather than social and interpersonal issues" (Kolb, 1984, p. 77). Abstract conceptualization emphasizes logical ideas, applying thinking skills and rationales.

Learners who use this learning mode are good at planning, work well with abstract

symbols, and use critical analysis for conceptual ideas. Paralleling abstract

conceptualization, learners who apply the convergent learning style also employ the

learning mode of active experimentation which concentrates on getting things done by

actively influencing their environment (p. 69). The final educator reported an assimilation

dominant learning style during lesson delivery, which applies the skills of observation in

relation to seemingly dissimilar concepts that, when analyzed, contain commonalities and

theories that are similar in logic and precision (Kolb, 1984, p.78).

The three educators who deviated from the overall educators' dominant learning

style (accommodation) for the lesson delivery activity provided their reflections that

supported their learning styles application. These reflections are summarized below.

Convergent learning style application during lesson delivery. University

educator Case 10 provided comprehensive examples of how the convergent learning style

was applied during the delivery of a lesson. With deep and honest conviction, she

explained that her approach to teaching involved all responses offered in the EICLS

Inventory (Mazo, 2008) for statement 5. A combination of solution-based problem

solving, practical application, connections with people, and engagement with new

experiences were identified as being applied within some of her lectures. As such, she

described the importance of teaching music in this way, because of its demand for theory

and its challenge for practice that run parallel in all facets when teaching content. The

convergent learning style was also dominant during the delivery of a lesson for university

educator Case 19—nine out of the twelve response for this activity indicated an

application of this learning style. For example, he explained that he used problem-solving

around an issue when teaching in the classroom. According the Kolb (1984), problem-solving is one of the strengths of the convergent learning style. As such, the act of problem solving involves the convergence of resources, ideas, concepts, and theories (p. 77).

    Assimilation learning style application during lesson delivery. The assimilation learning style includes the learning modes of abstract conceptualization and reflective observation. This style assimilates disparate observations into an integrated explanation (Grochow, 1973). It is focused on ideas and abstract concepts for their practical value. Logic and precision are critical to this learning style (Kolb, 1984, p. 78). University educator Case 24 applied the assimilation learning style during the delivery of a lesson activity. With 44 years of teaching experience and knowledge, this university educator provided a mini lecture about Aristotle's ethics and happiness as a model for his approach to lesson delivery. The nature of his topic indicates that the discipline of philosophy focuses on abstract concepts and reflection through observation, which are designated as characteristics and attributes of the assimilation learning style. This professor uses definitions to establish a basis of understanding for the context of his lecture. Once, he achieved this level of comprehension, he then applied Aristotle's ethics to a current situation in our daily lives. In other words, he assimilated Aristotle's ethics into today's context. The application of the assimilation learning style worked well for this professor, given the topic and the nature of the lecture.

        So, an example Aristotle says is as follows: We might have to change our mind about whether someone had been happy after he's dead. Everybody's really puzzled by that so I say well, supposing you had a guy who was really dedicated

to his kids, and spoiled them, gave them everything they ever wanted, he dies, and

then, you know, they just do these outrageous things. I'm not going to say that

happiness isn't an ample word here but is that the life that you want to have lived?

So that's what I was trying to indicate by that. Give them [students] lots of

examples and then let them play with the examples." (university educator Case

24)

Analysis of participants' comments in delivery of a lesson activity. Similar to the

development of a lesson activity, the dominant learning style of the majority of

participants in the delivery activity was accommodation. This indicated a consistency of

learning style application as the educators transitioned from development to delivery.

However, two of the educators applied the convergent learning style. It is critical to note

that in the transcript excerpts, both of these participants were consistent in how they

applied their style; both identified problem-solving or solution-based approaches in the

classroom which is one of the main characteristics of the convergent learning style. The

final participant applied the dominant learning style of assimilation. The transcript

excerpt clearly demonstrated the participant's application of abstract concepts

(happiness) with a strong example of how happiness is applied within a practical lifestyle

situation. This approach validated the application of assimilation learning style.

Debriefing of a lesson activity. Four out of seven educators (57.1%) applied the

assimilation learning style which was the dominant style used in general by all

participants during the debriefing activity. As such, both the inventory and interview

statistics aligned with the dominant use of assimilation. This learning style includes two

approaches: "[in using] inductive reasoning and the ability to create theoretical models,

[and] in assimilating disparate observations into an integrated explanation" (Grochow, 1973). This style combines two learning modes: abstract conceptualization which examines "logic, ideas, and concepts" (Kolb, 1984, p. 69), and reflective observation which investigates meanings through "carefully observing and impartially describing them" (p. 68). Reflection, intuition, and an appreciation of different perspectives are three characteristics of the assimilation learning style. Individuals who apply assimilation "like to rely on their own thoughts and feelings to form opinions (p. 68). Following is a summary of comments from interviewed participants which demonstrated and supported how the assimilation learning style was applied in the debriefing activity.

Based on the EICLS Inventory (Mazo, 2008) statement 17 response: I review after a lesson by c) reflecting on the general delivery of the lesson to ensure its approach was logical and precise (Assimilation (AS)), university educators Cases 7, 8, 9, and 10 provided significant reflections and comments that supported and sustained the attributes and adaptations characteristic of the assimilation learning style. University educator Case 7 explained that assimilating his knowledge, observations, and detailed notes and lesson plans from teaching the same topic for over a period of years was critical to ensuring that this complex amalgamation of concepts and ideas that were formed over this period of time were assimilated into the lesson in order for students to see the same concept, but from different perspectives. "Did I get that connection to them (students)?" University educator Case 9 described his approach to debriefing after his lesson as a way of reviewing not only the previous lesson that he had just delivered, but compared it to the last time he taught it which could be as long as a year prior to the current lesson. "I have a great memory on how that went, yesterday. And, how that went a year ago. So, you just

start seeing similar things. The reflection time after is that process, "Was that a complete waste of time for them?" or "Can I move on?" This confirmed the application of the assimilation learning style through this educator's review of various and disparate teaching experiences related to the same course and topic.

Convergent learning style application during lesson debriefing. Two out of seven participants' dialogues demonstrated and supported how the convergent learning style was applied in the debriefing activity. This learning style focuses on problem-solving, decision-making, and practical application of ideas (Kolb, 1984, p. 77). Again, based on the EICLS statement 17, these two educators chose to find methods of writing their thought and reflections about their lesson delivery. University educator Case 10 recorded on a yearly basis what things within the course needed to be changed or things that appeared boring to teach or to present to the students. Finally, one participant applied the divergent learning style when conducting a debriefing of a lesson. This learning style emphasizes "imaginative ability and awareness of meaning and values" (Kolb, 1984, p. 78). University educator Case 8 explained was clear in identifying the importance of making meaning from the content by ensuring that students engaged in it, rather than changing the actual content.

Analysis of participants' comments in debriefing of a lesson activity. Based on their interview texts, participants provided critical examples of how the majority of educators applied assimilation as their dominant learning style during the debriefing of a lesson activity. This also demonstrated a clear shift when educators transitioned from the delivery activity of a lesson to the debriefing and reflective activity of a lesson. This was a significant shift which also identified an alteration in the application of reflection after

the lesson was completed. For example, two participant cases reflected on the delivery of a lesson using a similar approach, which was to ensure that content was presented in different ways by having backup plans if the first effort to teach an idea or concept required unique explanations. As such, both educators were cognizant of the need to offer various perspectives, but to also bring all of these perspectives cohesively together; in other words, to assimilate these perspectives into a holistic, comprehensive understanding of the idea or concept.

Regarding the two university educators who applied convergent as their dominant learning style, these two educators clearly showed how this style worked for their abstract reflection after the delivery of a lesson activity. While this deviated from the overall dominant learning style of assimilation for debriefing, it is important to note that the assimilation and convergent learning styles share and both include within their styles, the learning mode of 'abstract conceptualization'. Hence, the shift from assimilation to convergent style is a logical one, given both styles seek to reflect and observe upon a lesson using inductive reasoning and using the abilities to synthesize and explain various observations (Grochow, 1973). For example, educators from both learning styles approached reflection by questioning the nature of the lesson, its purpose, its effectiveness, and its future impact. Due to this common and dominant learning style mode within assimilation and convergent learning styles, the shift to convergent for these two educators was not so far-reaching at first examination. The proximity and connectedness between these two styles supported the natural shift for these two educators, especially since both teach within disciplines that require abstract conceptualization—philosophy and music theory.

Finally, the educator who applied divergent as the dominant learning style (university educator Case 8), once again, the shift from assimilation to divergent suggested this logical move. Both learning styles include the learning mode of *reflective observation,* which emphasizes the logic and precision behind theories and concepts being taught (Kolb, 1984, p. 78). Given that the educator teaches in the discipline of education, the selection of instructional choices during the debriefing activity supported this learning style application.

Theme 2: Adaptation of Educators' Learning Styles Applications

As explained by Kolb (1984), adaptation within learning styles was critical to their successful application. This was achieved through Kolb's four adaptive learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation (p. 40). These learning modes were combined to create the four learning styles of assimilation (modes 2 and 3), accommodation (modes 1 and 4), convergent (modes 3 and 4), and divergent (modes 1 and 2), which provided the flexible framework for individuals to adjust, modify, and amend responses to learning situations. Further to adaptation, Kolb also understood the importance of learners applying and adapting the four complexities inherent within the act of learning, which were behavioral, symbolic, affective, and perceptual. Vygotsky's (1978) zone of proximal development framed this complex process of learning into a learning environment that involved both the learner and the teacher, where adaptive transference of knowledge occurred. One form of this learning environment is the lesson framework, as described and applied within this current study.

Hence, when adaptation is applied within the learning modes, which subsequently informs and supports the adaptive structures of the four learning styles, then learners transform and translate these complex adaptive skills using a deeply reflective and conscious pathway of choices. When educators selected instructional choices within the framework of a lesson based on the intricate relationship between learning complexities, learning modes, and learning styles, this resulted in a composite representation and awareness of their own learning style application during lesson creation. Conscious reflection of this composite image of an educator suggested that the role of an educator is influenced by an educator's learning style. This fundamental and comprehensive scaffolding that was developed by the educators before, during, and after a lesson, presented clear examples of adaptive structures that supported their own learning style. Meaning and mindfulness embedded within their language use and word selection presented deeper understandings about their instructional choices. The need to know why they made decisions and performed in specific ways was driven by a sense of curiosity about their learning approaches as they related to their lesson creation. Establishing a benchmark within their own learning structures was essential to their growth and perceptions of themselves as learners.

The adaptive responses evident within the educators' learning styles applications were articulated with alacrity within the explanations and reflections that were inclusive within their interview transcript texts. Upon examination of their considerations regarding their instructional choices, their need to expound on why, how, and what reasons lay behind their choices were critical to their own interpretations.

Adaptation of learning styles in lesson development activity. Closer examination of how educators adapted their learning styles during the first lesson activity revealed some important and critical information. Amongst those educators who were interviewed, six of the seven adapted their learning styles by indicating that their dominant learning style was accommodation.

When asked about their approach to choosing content for their lesson plan, several university educators identified situations and examples that went beyond theory, ensuring that they accommodated and applied them in the lesson content as a method of mitigating and managing the different and changing circumstances that they experienced during the delivery of their lesson. It was crucial that their lesson development reflected this adaptation, which was the foundation for a successful lesson delivery. University educator Case 7 described his understanding of what learning meant to him and how it translated this concept into the lesson plan: "My rationale is that learning is a process. So, I like to have real live situations that create critical thinking and problem solving opportunities that are appropriate to individual student learning needs and their learning outcomes, and their professional goals." One educator explained that a lesson is no "cookie cutter" situation and that a lesson plan needs to be flexible in its focus and flow. This same educator indicated that content selection was predicated on enabling adaptation for students by including new experiences and activities that allowed them to try things out. This educator adapted the content by developing ideas on the board through a series of questions and answers with the students. With respect to adaptation and lesson development, university educator Case 19 described his learning experiences as a graduate student, citing examples where as a student he needed to adapt to the

content being taught. Subsequently, he brings that same experience as a learner to the way that he approached his lesson planning. Finally, one educator articulated with clarity the importance of adapting content for the classroom based on what his role involved when in the classroom, explaining that much of the content that drives his lessons in the discipline of Philosophy is founded on the expected readings that students must have completed prior to the lesson. In selecting specific content through readings, he is "trying to get them to do other things that are much more engaged with, and to develop confidence." This presented an important example where the educator selected and adapted lesson content for instructional delivery effectiveness based on his learning style of accommodation. As such, adaptation in lesson development was essential and insightful to the success of the second lesson activity of delivery.

Adaptation of learning styles in lesson delivery activity. Adaptability in teaching a lesson is foundational to ensuring that the content created in the lesson development activity is clearly disseminated during the delivery of a lesson. In this second lesson activity, four out of seven educators indicated that their dominant learning style was accommodation. This suggested that a pattern of dominant learning style applications was established through a continuation of using the accommodation learning style within lesson delivery. This consistency also suggested that the concept of adaptation was inherent within the development and delivery lesson activities and that this connection enabled the educator to draw upon this consistency with confidence and commitment. This relationship between development and delivery activities provided insights into why it was valuable for educators to maintain this consistency for stability in transitioning from one activity to the other. The four educators who confirmed this

relationship also understood the requirement for verification of their development process through corroboration of delivery techniques, approaches, and standards. Two of the remaining three educators identified convergence as their dominant learning style for delivery. When comparing the learning modes within the learning styles of accommodation and convergence, they intersect through the mode of 'active experimentation' (Kolb, 1984, p. 78). Both learning styles seek to actively engage in the environment through adaptive measures that include some risk-taking and problem solving activities. Educators provided insights about the sequential application of the accommodation learning style from development to delivery activities of a lesson.

Regarding approaches to teaching a lesson, educators identified, described, and explained their techniques to lesson delivery by adapting to the nature and focus of the lecture. Three educators applied real time problem-solving, action-based learning, and real-world situations for discussion when delivering their lessons which reflected the accommodation learning style. This enabled these educators to take content from their lesson plan and customize it as required in the classroom. One of these three educators viewed learning as a "non-linear" process that was ongoing. As well, another educator adapted lesson content by accessing experts in the field or topic, allowing the educator and students to work through the content through various views and perspectives and by allowing students to writing about the content: writing offered a level of adaptation that was different that discussion—based on a divergent learning style approach. Adaptation of learning style was also applied through convergent, where one educator explained that teaching music was like bringing everything together from composition to actual playing of the musical piece. These educators strove to adapt their learning styles through the

instructional choices that they selected as they taught their lessons and as they adapted to the situations that are presented when teaching. It can then be observed that when educators apply their learning styles within the delivery of a lesson, the various adaptations that are used during teaching is one support system that they draw upon and access based on their previous knowledge as learners, which subsequently has been applied to their role as educators.

Adaptation of learning styles in lesson debriefing activity. Assimilation was identified as the dominant learning style in the debriefing (reflection) activity amongst the seven educators who were interviewed. This also supported the overall learning style usage pattern of 34 (EICLSup = 34 = ac(a1) and ac(a2) and as(a3)). Four (57.1%) university educators provided detailed descriptions about how they debriefed or reflected upon their lesson after its delivery. The dominant abilities within the learning style of assimilation are abstract conceptualization and reflective observation. These two adaptive learning modes include learning strategies such as assimilating various observations into a cohesive understanding (Grochow, 1973). As explained by Kolb (1984), reflective observation "focuses on understanding the meaning of ideas and situations by carefully observing and impartially describing them" (p. 68). Kolb further explained that this learning mode emphasized "reflection and not on action" (p. 68). Leaners draw upon their own ideas, and individual opinions and considerations. Two other educators indicated a dominant learning style of convergent, which also includes the learning mode of abstract conceptualization and which aligns directly with the assimilation learning style.

Debriefing a lesson. The act of debriefing a lesson can be accomplished in various ways, using different approaches, and applying unique strategies. However, in all situations reflection can be examined through a systematic series of questions. Reviewing a lesson by posing questions such as who, what, where, when, why, and how is an approach that is used by some educators. Interrogating or interviewing faculty members for the purpose of seeking peer-related feedback about the nature and structure of a lesson is another approach that is applied by educators. Examination of the lesson through deeper and more probing questioning enables educators to develop insights and complex meanings that connect the understandings between experience, learning, and reflection. As explained by university educator Case 7, the following excerpt provides insight into how he debriefed and reviewed his lesson after he delivered it to his students providing an example where questions are used to deconstruct the meaning of a play:

> I just saw a special [on television] a couple of hours ago and the songwriters on Fiddler on the Roof said the following: "How do we convince an audience that after the first act of the play it ends in a pogrom? Russian Cossacks come in and destroy the wedding. And then after the second act of the play, they are forced out of their shtetl and they have to leave and that is the reality of it. My grandparents were forced out of their shtetl, they were forced into the Pale. They were forced out. You have to give a play a musical where the end of the first act there is a destruction of the wedding and then they are forced from their village. Yeah. How do you delivery that? And when the songwriter said the following: "No, it is about this Jewish thing." And the producer said no, and *he kept on asking questions*. Finally, the songwriter said. It is about tradition, Fiddler on the Roof. The

producer said, that's it! *That is the connection.* That is how you are going to

deliver that. That is why I chose this response. Did I get that connection to them

(students)? (university educator Case 7)

For this educator, it was important that he ensure there was a connection between his

lesson content and student learning. His explanation provides an example of how probing

and deeper questions can help him to review the nature of his lesson, that they maintain

the integrity, honesty, and transparency of his lesson through salient and memorable

connections between his own experiences and student learning. When selecting his

instructional choice for statement 17 in the EICLS Inventory (Mazo, 2008), he chose the

following response: "I review after a lesson by reflecting on the general delivery of the

lesson to ensure its approach was logical and precise (assimilation)." His logical and

systematic approach to debriefing and reflecting on the delivery of his lesson was shaped

by the type and nature of questioning; his approach was also depicted through the role

and lens of a peer who engaged in this conversation of exploring the deeper meanings of

the play "Fiddler on the Roof."

Educators explained the variety of approaches that were used to transfer and adapt

their learning styles into the lesson activities of planning, organizing, delivering, and

conveying lesson content to students. Educators recognized that their personal learning

styles influenced how they made instructional choices and were cognizant of how they

adapted these choices within the framework of a lesson. Reflections of these choices were

critical to this adaptation and assisted educators in making adjustments and changes to

their lessons as required.

Theme 3: Educators' Reflections on How Learning Styles Are Applied Within a Lesson Framework

Reflections that were provided by the seven university educators within their interview transcripts revealed important understandings about the ways in which they applied their personal learning styles within the framework of a lesson. Through the ability to explain why they selected and applied specific instructional choices for a lesson, these educators were able to see the connections between their own personal learning styles and the ways that they were applied within a lesson framework (development, delivery, and debriefing). These educators also were cognizant of why it was important to know and understand their own learning styles in order to develop a sensitivity about students' learning styles. Reflecting upon the questions in the EICLS Inventory (Mazo, 2008), they saw the impact of how their own learning styles affected lesson creation. Reflection upon their person al learning experiences before becoming a teacher allowed them to envision how and why they chose specific instructional techniques, approaches, and methods. Indeed, the educators who were interviewed appreciated the importance of knowing the relationship between their own learning styles and the creation of lessons.

The following provides a compilation of key comments from educators who described, articulated, and postulated on how their own learning styles affected their lesson development, delivery, and debriefing (reflection).

When asked what he thought his learning style was, university educator Case 7 provided his reflections in the following way:

I know what my learning style is. I am an extremely visual learner. I cannot hear

without seeing. If someone is lecturing to me, I am more challenged than when I

am reading. I listen differently than how I am visually. Because communication is

not just listening or tactile. It is all of those things. But I learn best when it is

visual. I learn best when I am able to actually get hands on and do it. Show me.

Let me do it and make a mistake. I learn best by making mistakes and being given

the opportunity to do it again and again. And to know why I made the mistake.

And to be able to experiment. That pretty much is my learning style. (university

educator Case 7)

This educator was also asked the following questions: Do you want to add anything as to

how you have taken your learning style and placed it into your teaching? Do you see

what effect your learning style has in how you apply it to your teaching? His response

and reflections included various observations and events that he identified as critical to

the way that he learned, how he recognized his learning style from an early age, and how

his early teachers did not respond to his learning style when they taught. Now that he is a

university educator, these experiential learning events and knowledge informs how he

applies his own learning style and how he sees its effect in the way he teaches a lesson. A

description of his reflections about the relationship between his learning style and

teaching is presented below.

I have had teachers who did not recognize my learning style or understand that my

being so verbal was a way of my creativity and the ability to make mistakes and

actually do and touch was critical. Either was right or wrong. I also taught

elementary school and this was reinforced so I needed to learn learning styles.

(university educator Case 7)

Additionally, this university educator expounded on how recognizing and comprehending his own learning style enabled him to be more sensitive and tolerant to students. For example, it was noted by other students in one of his classes that one student had not uttered a word in any class since he had begun the program 3 years prior. In response to this knowledge, the educator explained that he did not try to impose his own strong verbal learning style approach onto the student, but rather approached him in an indirect and more open manner. The result was that the student began to engage verbally within minutes and continued to do so throughout the class. This is an example of how learning modes and styles can be applied effectively by an educator: "So, knowing my learning style and understanding how I learn, I understand that learning is done in many different ways." As such, this university educator had applied his learning style in a way that met the needs of this quiet student, as well as his own; the student felt comfortable to speak in the class and the university educator adapted his learning style to assist the student in establishing a voice within the class.

One of the university educators saw the connection between his previous learning experiences and how he taught in his discipline (Case 9). His reflections clearly indicated how his personal learning style affected his instructional choices and his teaching approaches in his classroom. Due to the challenges he experienced as a graduate student, this educator recognized some of the difficulties and errors that were made when he was learning as a student. In the interview session, he was asked if this was something that he brought to his lesson development process. While recognizing that he did, he further

explained that he applied his learning styles in various ways, depending on the nature and size of the class; a seminar was approached differently than a large class, allowing him flexibility in applying his learning styles.

Other reflections from educators included deeper, comprehensive narratives of the connections experienced between early learning years and how they have influenced their teaching practices. Most notably was one university educator (Case 8) who singled out her 5th and 6th grade school years as critical to shaping her learning and learning style. She was taught to learn using very independent study materials, which worked well for her learning style but not so for her sibling who was more social in her learning style. Later as a university student, and then as an educator, she discovered that there was an ongoing discussion about learning, learning styles, and different intelligences. This was of significant interest to her, given that her role as an educator continues to be informed by this knowledge.

In summary. The reflections of the interviewed educators indicated how their previous learning experiences subsequently shaped their learning styles which were applied when making instructional choices for their lessons. Early challenges in their own learning enabled them to reflect upon what worked and what did not work. These learning observations and knowledge were later applied within their development and delivery of their classes, which were indicated within the responses of the EICLS Inventory (Mazo, 2008). As such, the educators who provided their insights into their instructional choices for a lesson were clearly aware that their personal learning styles influenced their lessons. The implications of this knowledge is significant in that individual learning styles information do inform university educators about lesson

development and delivery and that a more critical awareness of their own personal

learning styles also assists in creating a more robust and effective learning environment

for both educators and students.

Summary of Qualitative Research Questions

Four questions were articulated for the purpose of defining and comprehending

the data that were collected from the in-depth interviews. These questions were designed

to identify a list of criteria that university educators used when making conscious

reflective instructional choices. As well, the interview transcripts were analyzed for

similarities and dissimilarities within the framework of a lesson based on learning styles,

discipline, and teaching experience. The following provides information that responds to

these questions.

1. What criteria do university educators use to make conscious reflective

   instructional choices within the framework of a lesson (development,

   delivery, and debriefing)?

Understanding what criteria university educators used to make their conscious

reflective instructional choices within the framework of a lesson was critical to

understanding the rationales and reasons that supported these decisions. Educators' own

criteria were based on their personal learning experiences and styles. Table 14 provides a

summary of the criteria that educators used regarding their instructional choices. Within

the lesson development activity, the university educators who were interviewed selected

key instructional choices that included situations and examples that went beyond the

theoretical concepts. These choices of criteria were directly related to the learning style of

accommodation. Other criteria that the educators used for instructional choices involved

the application of these theories within the context of different and changing

circumstances. Conversations with educators supported the use and application of these

instructional criteria which included the following: the inclusion of live situations and

examples, critical thinking, and changing circumstances. These were commonalities that

were significantly important for all university educators, except for one who selected a

divergent instructional choice that included concrete situations that were viewed from

many perspectives. The relationship between accommodation and divergent learning

styles is their similar use of the learning style mode of concrete experience which is

inherent in both learning styles. The university educators explained their instructional

choices and the criteria through descriptions of changing circumstances, critical thinking

skills, problem-based learning examples, situational thinking and discussions, and

storytelling through anecdotes. University educator Case 7 provided the following

rationale regarding one of his instructional choices:

> My rationale is that learning is a process and that during that process it is non-
> linear and it crosses disciplines and different topics. So, I like to have real live
> situations that create critical thinking and problem solving opportunities that are
> appropriate to individual student learning needs and their learning outcomes, and
> their professional goals. (university educator Case 7)

Table 14

University Educators: Criteria Used for Instructional Choices Within a Lesson Framework

Lesson framework	Criteria for instructional choices
Development of a lesson	• The process is non-linear • Live situations and examples • Critical thinking • Changing circumstances • What's the point of the class? • Problem-based learning approach • Situational thinking and discussion • Stories and anecdotes that provide meaning • Plan for lesson • Relationship between theory and practice
Delivery of a lesson	• Finding a solution in the lesson • Others perspectives and points of view • Engagement in the classroom • Action based approach using examples • Balance the theory with the practical • Critical thinking • Reflection in class and assignments • Theory and discussions (peer groups) • Brainstorming of ideas • Trusting learning environment • Dialogue, speaking, sharing in the moment • Establish rules and expectations in the classroom • Use of role models to explain and demonstrate theories and ideas
Debriefing of a lesson	• Writing ideas • Contemplation and consideration of the lesson • Review in my mind • Reflect back on different parts of the lesson • Review examples and samples within the lesson • Case studies and scenarios as examples • Narratives and stories

2. How are the conscious reflective instructional choices of university educators

similar or dissimilar within the framework of a lesson (development,

delivery, and debriefing) based on their *learning styles*?

Analysis of the three lesson activities indicated that there were three main

similarities and three main dissimilarities based on university educators' learning styles

and their instructional choices. The following provides detailed information about both

similarities and dissimilarities categories.

Learning styles in a lesson framework: Similarities. When considering learning

styles and their similarities, university educators' identified and explained three key areas

or common themes that were salient within their conscious instructional choices: within

the development of a lesson activity, the dominant learning style of accommodation was

consistently demonstrated within the interviewed university educators' insights and

explanations through repetition of the terms and phrases "situations and examples going

beyond theory," "changing circumstances," and "problem-solving" which are

characteristics and traits consistent with Kolb's (1984) accommodation learning style (p.

78); and within the delivery of a lesson activity, the dominant learning style of

accommodation continued to be applied by the majority of university educators who

participated in the study, which was supported by those who were interviewed in-depth

about their instructional choices. Their dialogues and conversations repeated the use of

phrases and explanations that were found in the development of a lesson activity, which

supported the survey results. The third common theme was within the debriefing of a

lesson activity, where the dominant learning style of assimilation was identified through

the university educators' instructional choices as they described this style through their

descriptive words, clear phrasing, and anecdotal explanations. Explications of these three common themes and similarities are provided below.

Similarity 1: Accommodation learning style in lesson development activity. With alacrity, 87.5% (*n* = 6/7) university educators' who were interviewed about their conscious reflective instructional choices indicated their dominant learning style as accommodation. This is significant in that educators identified and explained their lesson development behaviors that aligned with the characteristics and traits of the accommodation learning style. The accommodation learning style is described by Kolb (1984) as follows: "This style is called accommodation because it is best suited for those situations where one must adapt oneself to changing immediate circumstances" (p. 78). "People with an accommodative orientation tend to solve problems in an intuitive trial-and-error manner" (Grochow, 1973). These descriptions are supported by the interview transcripts within the dialogue of university educators. For example, for survey question 1: When I choose content for a lesson, I like to…, the majority of educators selected the following response "include situations and examples that go beyond theory and apply different and changing circumstances." The educators' reflective dialogues supported this dominant learning style selection, which also reflected Kolb's definition of the accommodation style that included adaptation within the immediate teaching and learning circumstances. University educator Case 7 provided the following reflective dialogue regarding his instructional choice for this question: "So, by having situations and examples that go beyond theory and apply in different and changing circumstances allows me to be very student-centric when I choose content."

Similarity 2: Accommodation learning style in lesson delivery activity. The dominant learning of accommodation continued from development to delivery of a lesson activity. The relationship between the two lesson activities indicated a strong application of the same learning style. This continuity demonstrated the need for university educators to ensure that the lesson plans that they created were subsequently delivered in the lesson. This continuity was supported by several educators who were interviewed regarding their conscious reflective observations and explanations about their instructional choices. Examples of this continued accommodation was observed when two educators (Cases 7 and 9) were establishing rules, regulations, and ethical guidelines within the lesson delivery activity. These two university educators explained their use of the accommodation learning style by selecting response d) which points to the use of real life examples when defining and setting rules in the classroom. They both accommodated learning and teaching in the lesson through appropriate examples that supported the lesson content by offering salient ways to address the issue of plagiarism through APA style usage when writing and developing an abstract for a paper or for a business plan, and by explaining to students that situations are different and require critical thinking in relation to making ethical choices and decisions.

Similarity 3: Assimilation learning style in lesson debriefing activity. The similarity within the third activity of a lesson framework, debriefing, is minimal when compared to the first two activities of a lesson (development and delivery). A shift to assimilation as the dominant learning style signals a clear change in the university educators' approach to the final stage of a lesson framework. Similarity is demonstrated in the 57.1% who selected conscious instructional choices that epitomize the assimilation

learning style. "The greatest strength of this orientation lies in inductive reasoning and the ability to create theoretical models, in assimilating disparate observations into an integrated explanation (Grochow, 1973)." University educator Cases 7 and 9 provided important information about how their instructional choices supported their assimilation learning style in relation to the debriefing of a lesson activity. Both university educators reflected upon the delivery of their lesson by reviewing parts or sections of their content through observations, and by thinking through the logical and sequential approaches to their lesson. They felt it was important to review the overall success of their lesson, observing their instructional decisions, and replaying them to support how their next lesson will be affected, as well as long-term future approaches. Cohesion of a lesson was also critical to reflection of a lesson delivery. University educator Case 9 stated, "I want to know how that thread, when I go off on a tangent, how do I weave all this together so it is a cohesive lesson." This is a clear example of how disparate observations of a lesson delivery help to shape the next lesson(s).

Learning styles in a lesson framework: Dissimilarities. There were three dissimilarities noted within the development, delivery, and debriefing activities of a lesson. Following is a summary that identifies and explains these dissimilarities.

Dissimilarity 1: Only one educator applied a different learning style. Only one university educator deviated from the dominant learning style of accommodation in the development of a lesson activity (14.1%). This educator indicated a dominant learning style of divergent (D), which focuses on the learning modes of "concrete experience and reflective observation. The greatest strength of this orientation lies in imaginative ability and awareness of meaning and values" (Kolb, 1984, p. 78). Imaginative examples and

experiences that involved meaning and values were ways in which this university educator applied her divergent learning style. This university educator felt it important to provide a divergent and expanded version of values and meanings into the lessons that were being developed. As a music historian, she included the history of First Nations music and culture for the purpose of establishing a connection between their contributions to music in Canada and how it affects the current student groups. Her ability to bring these values and meanings to her lesson development supported the next activity of lesson delivery (university educator Case 10).

Dissimilarity 2: Approximately 28% of educators shifted to the convergent learning style. While the majority of educators continued to apply the accommodation learning style in the delivery of a lesson activity (57.1%), more than 28 percent (28.5%) applied convergent (C) as their dominant learning style. "The greatest strength of this approach lies in problem solving, decision making and the practical application of ideas" (Torrealba, 1972; Kolb, 1984). This shift indicated a broader application of learning styles within lesson delivery, which is a realistic explanation, given that development (creation) and delivery (distribution, conveyance, and transference) of a lesson differs in their actions and performances. University educators Cases 10 and 19 explained that problem-solving and practical application were essential to their delivery of their lessons.

Dissimilarity 3: A shift in learning style. The dominant learning style for the debriefing activity was assimilation (AS). However, once again, two university educators indicated convergent (C) as their dominant learning when identifying their conscious instructional choices within the inventory. In the situation of university educator Case 10, there was evidence of ambivalence about her initial response of a) which is the

convergent learning style. She explained that she would also select c) which is the

assimilation learning style and d) which is the accommodation learning style. As such,

this university educator's inclusion of three out of four learning styles demonstrated her

adaptability to applying three of the four learning styles. This suggested that university

educators can apply more than one learning style when reflecting on their lesson delivery.

This also suggested that being aware of more than learning style offered a broader range

of understanding of application in relation to their own personal learning styles.

3. How are the conscious reflective instructional choices of university educators

similar or dissimilar within the framework of a lesson (development,

delivery, and debriefing) based on their *discipline/specialty*?

Analyzing the discipline/specialty of university educators provided critical

information about which faculty or area of specialization applied what learning style

when engaged in the development, delivery, and debriefing activities of a lesson

framework. Identifying the dominant learning styles within each discipline offered

insights into the instructional choices of educators.

Discipline/specialty: Similarities. The relationship between a university

educator's instructional choices and his or her discipline offered insights into changing

circumstances while teaching. The following identifies three important similarities that

were salient to understanding this relationship.

Similarity 1: All but one educator applied accommodation in the development

activity. Within the development activity of a lesson, six out of the seven (85.7%)

educators applied the accommodation style. They included the disciplines of business,

education, fine arts, and social sciences. Only one educator from fine arts applied the

divergent learning style. This indicated that all disciplines represented in this specific group consistently applied the accommodation style. Hence, discipline/specialty was not a minimal factor when applying their learning style during the development of course content.

Similarity 2: More than a third were from business. Within the seven educators who were interviewed, 42.8 % ($n = 3/7$) were from the discipline of business. This was higher than the overall representation of 36.8% ($n = 14/38$) for the study. In relation to the development of a lesson, all three educators applied accommodation as their dominant learning style. Two out of the three business educators continued to apply accommodation as their dominant learning style during the delivery of a lesson activity.

Similarity 3: Same dominant learning style usage pattern. Three of the interviewed university educators applied the overall usage pattern for the study: EICLSup $= 34 =$ ac (accommodation) and ac (accommodation) and as (assimilation). This provides a solid representation and supports the overall number of educators who applied this usage pattern. There were six university educators who applied usage pattern 34. As such, the three out of seven interviewed university educators who applied this pattern indicated an overrepresentation proportionately.

Discipline/specialty: Dissimilarities. There were also significant dissimilarities between the disciplines, how educators were represented and how learning styles were applied and distributed across the disciplines who participated in the study.

Dissimilarity 1: Discipline of science was not represented. Within the group of educators who represented the disciplines, there was no individual university educator who was interviewed from science. As such, the discipline of science constituted 15.8%

($n = 6/38$). However, all other disciplines that were represented in the study participated in the interview part.

Dissimilarity 2: University educator 10. In comparison to the other university educators who were interviewed, University educator Case 10 indicated a significantly different learning styles usage pattern: EICLSup 8 = divergent (d) and convergent (c) and convergent (c). This educator taught music theory, which she explained included history, applied music techniques, and English language proficiency. Given this unique combination of teaching approaches and skills, this educator applied the divergent learning style during the development activity of a lesson, compared with all other educators who were interviewed who applied the accommodation learning style. This was also the case during the delivery and debriefing activities of a lesson, where university educator Case10 applied the convergent learning style as the dominant one. This application was dissimilar when compared to the other interviewed educators who selected the accommodation learning style and the assimilation learning style respectively, as their dominant styles.

Dissimilarity 3: Minimal use of the divergent learning style. It is clearly shown within the conscious instructional choices of the interviewed educators that the Divergent learning style is applied minimally. Only twice was it selected as a dominant learning style within the framework of a lesson (development, delivery, and debriefing). This is significant in that the characteristics and qualities of the divergent learning style is being applied minimally across the disciplines of fine arts, business, education, and social sciences.

4. How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their *teaching experience*?

Analyzing the teaching experience of university educators provided basic information regarding the total sum of teaching years, the average number of years, the and the minimum and maximum number of years of teaching the interviewed university educators provided. Understanding the level of teaching experience offered foundation knowledge about the types of faculty members who participated in the study and the interest that they had in the study, overall.

Teaching experience: Similarities. It is interesting to observe the breadth and depth of knowledge and experience that was inclusive amongst the educator population that was interviewed. Three similarities were identified as a key to comprehending this information.

Similarity 1: Majority had taught for over a decade. More than 70% (71.4%; $n =$ 5/7) of the interviewed educators indicated that they had taught for 10 or more years. This provided a solid foundation of teaching experience from which the educators extracted their responses to the inventory and further explained within their interview transcripts. The range of teaching years spanned from 4 years to 44 years, which included under 5 years of teaching experience or new to teaching, and over 10 years of teaching experience or very experienced in teaching practices.

Similarity 2: Discipline of business had new-to-teaching educators. The two university educators who both had only 4 years of teaching experience, were both from the discipline of business. These two educators had been working within their industry

for many years before teaching within their discipline. While their teaching experience was considered new and short term, it was their adaptation of their own learning styles into their teaching practices that helped them to transition from industry to academia. The awareness of their learning styles assisted them in shaping and applying instructional choices that supported learning and teaching in the classroom.

Similarity 3: Total sum of teaching years. It is significant to note that within only seven university educators there was a total of 125 years of experience and knowledge that was brought to this study for the purposes of understanding educators' conscious instructional choices within the framework of a lesson. As researcher, I was able to access the depth and breadth of the educators and how they approached and applied their personal learning styles within a lesson. In comparison to all of the educators who participated ($n = 38$), the seven educators constituted close to one-third (29.5%) of the total number of teaching years. Within the seven, the highest number of teaching years recorded for an individual educator was 44 years.

Teaching experience: Dissimilarities. While there were fewer dissimilarities within the educator population that was interviewed, there were three that provided insights into the nature of educators' backgrounds.

Dissimilarity 1: Only one educator taught for over four decades. Four decades of teaching as a university educator was very rare, with only twice recorded in the inventory. One of these educators chose to participate in the interview to share his conscious instructional choices within the framework of a lesson. His discipline was in arts (social sciences) in the field of political theory and philosophy. This was also a very unique occurrence in the study, overall. Only one other educator had taught for four

decades, but did not participate in the interview part of the study and was situated within the area of public administration and public affairs.

   Dissimilarity 2: Gender disparity of teaching experience. Two of the seven university educators were female. One taught for 18 years in the discipline of education. The other one taught for 12 years in the discipline of fine arts (music). The remaining five educators who were interviewed were male with a teaching range of 4-44 years of experience. This imbalance within the gender representation was *not* indicative of the entire population of the study, where 24/38 participants or 63.1% were female and 36.8% or 14/38 were make. As such, the female representation of those who were interviewed did not align with the overall study.

   Dissimilarity 3: Dominant learning styles usage pattern and teaching experience. The dominant learning style usage pattern (34) was applied by three of the seven educators who were interviewed. However, there was no standard range of length of teaching years among them. Two were male and taught for 4 years, and one was female who taught for 12 years. This suggested that the number of teaching years of experience do not necessarily indicate the type of learning styles usage pattern.

Summary of Qualitative Data

   In summary, the qualitative data derived from the educators' interview transcripts provided rich and detailed support in relation to the data from the EICLS Inventory (Mazo, 2008). There were three significant findings within the qualitative data.

   The first qualitative data finding indicated that the conscious instructional choices of university educators were clearly supported by the comprehensive discussions that occurred during the interviews. This was confirmed repeatedly in the dialogue and

conversations with the educators, which were demonstrated in the word categories and codes that were used to measure and track how the educators voiced and explained why they chose specific teaching approaches and instructional techniques. These categories and codes demonstrated that they were very self-aware of their personal learning styles.

The second qualitative data finding demonstrated among the university educators is that there exists a significant self-awareness of their personal learning styles, based on their own observations of their learning experiences that occurred as a young learner before they engaged in a teaching role. The reflections and insights that they explicated from the past in various format, including narratives and anecdotes, offered a scaffold connection between their learning styles that were developed in the past and how they were adapted and applied within their current teaching practices and roles. The self-awareness of their learning styles supported their ability to expand, reflect upon, and transform into the type of university educator seeking quality of learning and teaching.

The third qualitative data finding involved the relationship between the university educators' instructional choices, their learning styles, and their transformative reflection within the lesson framework (development, delivery, and debriefing). Relative to their learning styles, educators understood the shift that occurred in the debriefing activity of a lesson. They comprehended and recognized the need to reflect upon their lesson after its delivery, but clearly did not apply the same learning style as they did in the first two activities (development and delivery). This strongly suggested that the activity of reflection, review, and debriefing of a lesson required a shift or significant adaption of their learning styles.

Discussion of Quantitative and Qualitative Findings

An examination of quantitative and qualitative findings revealed two key associations between the EICLS Inventory (Mazo, 2008) and the interview transcripts. These two core associations between the two sets of data indicated a solid triangulation of the data that supports the nature and focus of this research study.

The dominant learning style that was applied in the development and delivery lesson activities was, the accommodation learning style. This was supported in the statistics from the inventory and further supported by the interview transcripts. In general, university educators were consistent in their application of the same dominant learning style, indicating a constancy of transference from course development to lesson instruction.

The dominant learning styles shift occurred in the final activity of a lesson (debriefing). The choices recorded in the inventory were supported by the educators' explanations and descriptions as to how they approached this activity. While there was the emergence of a dominant learning style (assimilation), both quantitative and qualitative data demonstrated a greater diversity of learning style application when consciously reflecting on the instructional choices regarding debriefing a lesson.

Evidence of Trustworthiness

Trustworthiness in relation to this study involved the concepts of credibility, transferability, dependability, confirmability, and intra-/intercoder reliability. The implementation of these processes are described and articulated below.

Credibility of this study was addressed in three ways, which included triangulation, peer review, and reflexivity. *Triangulation* was established in data

collection through the use of the EICLS Inventory (Mazo, 2008; quantitative) and one-on-one interviews (qualitative). The results from the inventory and from the interview were compared for similarities and dissimilarities, and to determine the relationship between learning styles, lesson development activities, and reflections. *Peer-review* was conducted through the dissertation committee members, and the Internal Review Board (IRB) for rigor.

Transferability of results from this study was established through participants who represented characteristics through gender, age, teaching experience, and teaching discipline/ specialty. This diversity of population will enable transference of the results to similar groups outside of the two groups used within this study. *Dependability* was established in this study through triangulation. The results from the inventory and the in-depth interviews provided critical information that supported the outcomes.

Additionally, *confirmability* was established through reflexivity where the relationship between the cause and effect within the study was examined.

Summary of Chapter

Results provided important statistics that were relevant to answering the quantitative questions related to Part I: Inventory. It can be noted that the general learning styles usage pattern for all participants is as follows: EICLSup = 34 = ac(accommodation) and ac(accommodation) and as(assimilation). Within this usage pattern exists a consistency of learning style that was applied during the first two activities of a lesson plan (development and delivery). The importance of beginning and continuing with their same learning style significantly suggested that university educators understand and consciously apply their personal learning styles in a sequential and

constant pattern. However, when university educators begin to reflect upon their lessons after they have been delivered, then there is a fundamental shift. These reflections, reviews, observations about their instructional choices were foundational to ensuring that their teaching approaches and practices remained consistent and supportive of quality learning and teaching. As such, university educators demonstrated their strength in learning styles applications during a lesson framework and indicated these strengths and patterns through the inventory and interviews.

Chapter 5 includes conclusions based on the interpretations of the findings as they relate to the comparative findings within literature, and as they are interpreted within the context of theoretical and conceptual frameworks. Additionally, implications of this study are discussed with respect to positive social change, methodologies, and theories, with a focus and understanding of recommendations for practice.

Chapter 5: Conclusions and Recommendations

Introduction

This mixed methods sequential explanatory study had two purposes—to identify instructional choices, learning style preferences, and learning style patterns of university educators as they relate to the framework of a lesson, including development, delivery, and debriefing (quantitative method); and to interpret the meaning of university educators' conscious reflective instructional choices (qualitative method). The Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008) was administered first to 38 university educators in order to discern the learning styles applications and patterns of usage they used when engaged in lesson activities. Second, the interviews conducted with seven of these university educators provided a more in-depth view regarding the relationship between their applied personal learning styles when making instructional choices in a lesson framework and how the act of debriefing (reflection) enabled them to identify this inherent connection.

Regarding the first purpose, I sought to record and identify the conscious reflective instructional choices of university educators within the framework of a lesson (development, delivery, and debriefing), identify the learning style preferences of university educators as they are applied within the lesson framework, and determine the learning style patterns resulting from the applied learning style preferences (quantitative method). The independent variables included the three main instructional activities that constitute the basic framework of a lesson. As each of the three parts of the EICLS Inventory (Mazo, 2008)—development, delivery, and debriefing—was completed, the university educator was asked to make one instructional choice from each set of

statements which, when collectively calculated, identified the dominant learning style applied within each part of the lesson. The combination of these three dominant learning styles was inserted into a coding system (Appendix E), which resulted in determining the learning styles usage pattern of the university educator and subsequently the usage pattern of the discipline. The dependent variables included 20 instructional choices based on the statements within the EICLS Inventory, four demographic variables (gender, age, teaching experience, and teaching discipline/speciality), four learning styles (Kolb's [1984] learning styles: convergent, divergent, accommodation, and assimilation), and learning styles usage patterns (see Appendix F for a list of the dependent variables).

The second purpose of this study was to interpret the meaning of university educators' conscious reflective instructional choices using in-depth interviews to capture the reflections, attitudes, and rationales attached to these choices. While the results of the EICLS Inventory (Mazo, 2008) included the identification of university educators' instructional choices within a lesson framework, they did not provide an explanation as to *how* and *why* they arrived at their instructional choices (qualitative). Insights and analyses drawn from the interview conversations revealed some connections between university educators' personal learning styles applications within a lesson framework and their conscious reflections. More specifically, the reflection of and the telling about stories from previous learning experiences, and the word selection and frequency used within their descriptions and explanations, demonstrated that university educators used their early learning styles to make instructional choices during lesson creation activities.

Summary of the Nature of the Study

A mixed methods research paradigm with a sequential explanatory design allowed for triangulation of data, which helped to establish consistency and validity through multiple perspectives (Creswell, 2009, p. 211; Greene, 2007; Teddlie & Tashakkori, 2009, pp. 153-154). Additionally, the approach to this study included triangulation of data, which was used to establish consistency and validity through multiple perspectives. Situating the quantitative research paradigm as the first and dominant strategy allowed for the initial collection of university educators' instructional choices and learning style preferences within the framework of a lesson (development, delivery, and debriefing) and subsequently allowed for the determination of educators' learning style usage patterns. Sequencing the qualitative research paradigm as the second part of data collection enabled me to gather data that were enriched with consciously reflective narrative content for analysis, providing a deeper understanding of university educators' instructional choices and explaining their reasons for selecting these choices. A summary of the key findings for this research is provided within the next section.

Summary of Key Findings of Chapter 4

The key findings, as reported in Chapter 4, provided important insights into how university educators selected their instructional choices within a lesson framework in relation to their learning styles. The following is a summary of the main findings for both quantitative and qualitative methods used within the study.

Quantitative findings. The results from the EICLS Inventory (Mazo, 2008) indicated three key findings: based on their instructional choices during a lesson framework, university educators consistently applied the accommodation learning style

during lesson development and delivery activities; based on their instructional choices during a lesson framework, university educators shifted their learning style application to the assimilation learning style during the debriefing of a lesson activity; and based on the results, one learning style usage pattern was identified as being applied more than any other (Pattern 34; Appendix F).

Qualitative findings. The main research question was the following: When university educators make instructional choices within the framework of a lesson (development, delivery, and debriefing), what conscious reflections about these choices do they make?

Two findings were congruent with the inventory findings of Part I. Overall, the strength of the findings was "strong" given this congruence. Analysis of language use and word frequency in university educators' interviews supported the EICLS Inventory (Mazo, 2008) results. The two findings were the following: university educators reported applying their learning styles through adaptation within the framework of a lesson (development, delivery, and debriefing), and early learning experiences of the university educators were reported to have shaped their learning styles and to have shaped how they applied their learning styles within the context of a teaching role set within the framework of a lesson.

Interpretation of the Findings in Relation to the Literature

Based on the extensive literature review presented in Chapter 2, the following is a comprehensive interpretation of how specific theories and models supported the theories of this study. The interpretations of the results provide insights into the three areas in the conceptual framework, which included instructional design theories; psychological,

developmental, and educational perspectives in relation to learning styles; and conceptual frameworks and reflections.

Recently, Kolb et al. (2014) completed a study on the profile of educators' role, which extended his work. The study provides a dynamic model that matches learning style with the educator role for the purpose of improving the understanding of student engagement. Similarly, my study focuses on the educator; however, it examines how educators teaching in the higher education system (universities/colleges) apply their own learning styles within the framework of the basic lesson structure (development, delivery, and debriefing) through the process of selecting their instructional choices. This current research extends Kolb's (1984) theory by providing two additional factors to consider within the context of the educator's role: the role that university educators' learning styles play in making instructional choices for a lesson, and the role that university educators' conscious reflections about a lesson play when establishing a connection between educators' personal learning styles and their instructional choices.

Instructional Design Theories

University educators designed their lessons in congruence with instructional design theories. Through specific examples, university educators provided various examples in their responses that included evidence of how they applied different instructional design theories within their lesson framework (development, delivery, and debriefing). When compared with Bloom's (1956) taxonomy of educational objectives, the data confirmed how university educators used Bloom's three domains where educational objectives could be classified, which included cognitive, affective, and psychomotor. Based on the responses from university educators in both the inventory and

the interview stages, there were clear indicators that supported the use of these three

domains when teaching within the framework of a lesson. University educators applied

the cognitive domain in all three lesson activities (development, delivery, and debriefing),

which included a sequential compilation of knowledge, analysis, synthesis, and

evaluation.

Bloom's affective domain was applied within the framework of a lesson by

receiving, responding, and valuing learners' interests and motivations with the delivery of

a lesson. An example of this application can be witnessed through the narrative of

Participant Case 7:

> By me being able to hear what my students are saying, that is where the learning
>
> is occurring. It is not occurring with me; it is occurring with them. And, the only
>
> way to do that is to listen to them. (university educator Case 7)

Bloom's third domain, psychomotor, was also applied by all the participants. Responses

within the inventory and explanations within the interview narratives provided numerous

and rich examples of how psychomotor skills were enacted during the framework of a

lesson. University educator Case 8 used the psychomotor domain through activities such

as writing, composing music, playing music, and singing. Most university educators used

writing as the core application of the psychomotor domain.

Supporting Reigeluth's (1978) elaboration theory, the findings indicated a

plethora of examples that demonstrated the application of elaboration within the

framework of a lesson. Teaching university-level education requires educators to provide

details about a lesson at numerous and complex levels. The findings showed that the

majority of the university educators who completed the inventory applied the

accommodation learning style as their dominant learning style during the development (*n* = 23/38; 60.2%) and delivery (*n* = 20/38; 52.6%) lesson activities (Table 3). When reviewing the definitions of the accommodation learning style, which involves interaction between the learning style modes of active experimentation and concrete experience (Kolb, 1984, pp. 68-69, 78), university educators applied and adapted regularly the characteristics and activities as described within these learning modes (pp. 68-69).

Those educators who applied the accommodation learning style in the development of a lesson activity selected the following instructional choices in the EICLS Inventory (Mazo, 2008): include situations and examples that go beyond theory and can be applied in different and changing circumstances; organize my lesson content around doing things that involve new experiences and activities that allow students to try things out; and involve theoretical models that provide an explanation of how all of the processes work together. Other instructional choices during lesson delivery included the following: provide opportunities for students to engage in new experiences; and provide expert and peer discussion and review that supports intuitive, trial-and-error thinking (Appendix D). All of these selections for developing and delivering a lesson provide examples of real-life applications of the accommodation learning style and confirm Reigeluth's (1978) elaboration theory that identifies a holistic approach to teaching and learning. Inclusive, rapid, and adaptable learning situations comprise the core of Reigeluth's theory, which aligns with the accommodation learning style that includes the active experimentation mode, which "actively influenc[es] people and chang[es] situations it emphasizes" (Kolb, 1984, p. 69), and concrete experience mode, which

"focuses on being involved in experiences and dealing with immediate human situations in a personal way" (p. 68).

The third learning theory focused on Gagné's (1985) conditions of learning, which involves five learning outcomes and nine events of learning. The EICLS Inventory (Mazo, 2008) results presented supporting evidence of the application of Gagné's learning outcomes, including intellectual, verbal, cognitive, motor, and attitudinal skills, as well as attributes that are inherent in teaching and learning activities. In relation to the framework of a lesson, university educators recorded instructional choices that reflected Gagné's outcomes. Examples of the application of these outcomes during lesson development, delivery, and debriefing included learning activities such as situational thinking, new experiences, experimentation, experiences requiring action, question and answer approaches, peer discussion, role modeling, time for reflection, real-time activities, and listening and speaking or presentation opportunities within the lesson, all of which were further expanded on during the interviews. These instructional choices also reflected the core activities that are included within the accommodation learning style, which was the majority of educators' applied learning style within the development and delivery lesson activities. Additionally, university educators demonstrated Gagné's learning outcomes by application of the assimilation learning style during the debriefing of a lesson, which included instructional choices such as logic, precision, explanations, models, and reflective activities. Based on the application of Gagné's five learning outcomes, the findings demonstrated that his conditions of learning theory was relevant and applicable to instructional theory and learning styles theory (Appendices D and N).

As such, the instructional design theories of Bloom (1956), Reigeluth (1978), and Gagné (1985) were demonstrated and evident in the instructional choices that were made by university educators within the framework of a lesson (development, delivery, and debriefing) as it was defined within this current study.

Psychological, Developmental, and Educational Perspectives

Psychological, developmental, and educational dimensions of learning styles were evident in the university educators' consolidated responses within the context of a lesson framework. Jung ([1921] 1971) and Kolb (1984) provided a basis for the connections between personality styles and learning styles, with Kolb adapting Jung's eight psychological personality types into his experiential learning theory (ELT). By Kolb adapting these eight personality styles into his theory, a deeper understanding of how personality and learning styles intersect during learning activities evolved, and it continues to evolve with Kolb's current research (2014, unpublished) that explores the role of the educator.

When university educators reported bringing both of these styles to the process of deciding on instructional choices and reflecting on these choices, a pattern of preferences developed. This was demonstrated in the most common learning style pattern that was used by many educators when making instructional choices. For example, Learning Style Pattern 34 (EICLSup = (a1)ac and (a2)ac and (a3)as) was applied by more university educators within the framework of a lesson than any other pattern (Table 4). This was indicated through analysis of the EICLS Inventory (Mazo, 2008) responses and was further established within the interviews. Educators' instructional selections revealed

patterns of learning styles that they adapted in alignment with their own learning approaches and in relation to a lesson framework.

Regarding developmental perspectives, Piaget's (1973) and Kohlberg's (1973) theories on development and cognition were identified through the university educators' interviews as they reflected on their childhood and/or previous learning experiences in relation to adult learning approaches. In university educator Case 7, the educator reflected on and explained how the connection between his dominant learning style, as it was shaped when he was in his early school years, affected the way he applied it when teaching a lesson to adult learners.

Vygotsky's (1978) learning theory and educational perspective substantiated the relationship between learner and educator. His "zone of proximal development" and "more knowledgeable others" (MKOs) were clearly demonstrated within the lesson framework. Through their instructional choices, the university educators who participated in this study identified various ways of collaborating with students by way of lesson activities such as small group discussions with students and one-on-one educational feedback to students when learning how to write a paper or how to write a score for a song. As MKOs, university educators described the importance of developing a strong rapport with students while engaged in learning concepts, theories, and best practices. For example, university educator Case 7 described how his ability to insert his background and knowledge into classroom conversations and discussions that related directly to the topic being taught to students who were in his class was critical to establishing a safe and comfortable zone of learning. This educator considered himself as an expert or MKO and

strove to create a zone of learning that benefited both learner and educator. The result was a successful lesson for both.

Conceptual Frameworks and Reflection

University educators consistently reflected consciously upon their lessons through debriefing. Brookfield's (1995) research on critical reflection provides a relevant model from which to analyze how university educators reflected on their lesson processes. The concept of reflecting on educators' teaching approaches through their own perspectives was presented by Brookfield which comprised four elements, which included autobiography, students, colleagues, and theory. All four perspectives were found to be evident within the reflections of the university educators who were interviewed for this current study. Seven educators provided autobiographical reflections about their early learning styles that were shaped as young learners, and how they consciously reflected on the connections and relationships between their learning styles and lessons. Their conversations offered rich descriptions about how the awareness of their learning styles informed their development, teaching, and post-reflections of their lessons. These reflections were shared with their colleagues who were viewed as one part of the reflective system that they applied to lesson development and delivery.

The participants repeatedly referred to reflection as they described their lesson activities. This established a deeper connection and meaning with their own learning styles and approaches to teaching. Fiddler and Marienau (2008) identified reflection as an integral part of an educator's role, which was to bridge the gap between "experience and learning" (p. 76). They further identified the question "What's getting my attention?" which can also be applied to the educator as a personal learning approach. For example,

one educator narrated the story of Fiddler on the Roof to his students, which offered an analogy for a concept he was explaining. This was a meaningful story for him and therefore "got his attention" as a learner, which was subsequently used in his role as an educator. The learning style used to transfer this lesson delivery device to his students is a strong example of how educators reflect upon their course content, attach meaning to this content, and then share it with their students within a lesson framework. This also provides an important example of Fiddler and Marienau's events model of learning from experience (p. 82) from the perspective of an educator. As such, one of the products of reflection when an educator takes the time to debrief or ponder on a lesson is the direct self-analysis as a learner and the mirroring of the early learning behaviors or styles in the teaching approaches. Most notably, university educator Cases 7 and 9 made direct connections between their early learning experiences in the classroom and their methods of delivery when teaching a lesson.

Reflection is critical to establishing a connection between educators' early learning styles and their teaching roles. When educators reflect upon content, delivery, and the processes that support these two activities, it is incumbent upon them to ponder, consider, evaluate, as well as to affect positive social change within a lesson framework. Fiddler and Marienau (2008), in their developing habits of reflection for meaningful learning model, examined the crucial role that reflection plays in learning. In their events model of learning from experience," the act of reflection is situated in the center and positioned between learning experience and meaningful learning (p. 82). Reflection acts as a bridge for learners to transition to and transform into critical, analytical, and unique meanings as they relate to what is being taught during the lesson. Fiddler and Marienau

further explained how reflection is the catalyst to learning from experience: "Conversion, then, of an experience to meaningful learning is the role of reflection. What a student puts her or his attention toward—the object of reflection, and how she or he does that, the process of reflection—is the heart of learning from experience" (p. 83).

As such, when learners identify salient points in a lesson, reflection upon this knowledge enables them to recognize and then assemble the deeper meanings connected to these points. When Fiddler and Marienau's (2008) model is superimposed upon university educators' roles, reflection is important because of educators' activities to review and respond to their considerations of the lesson that they delivered. Completing the final stage of a lesson framework (debriefing) enables educators to weave their way through the processes included in the events model:"events, experience, reflection, and meaningful learning" (p. 82). When these processes are inserted within the framework of a lesson, the relationship between learning from experience and reflection is cyclical.

In relation to the framework of a lesson, development is the first activity. An educator is tasked with creating the lesson plan, ensuring that it includes learning events that are meaningful, salient, and purposeful to the learner. These events can be presented in various formats, including but not limited to discussions, exercises, essays, field trips, and exams. Reflection enters into this first lesson activity through consideration of these selected instructional choices. These choices are influenced by the educator's learning styles. The instructional choices that educators make when developing a lesson are presented in the classroom which in turn become experiences for both the educator who is delivering the lesson and for the student. These experiences are reflected upon by the educator for the second time during the active engagement of the lesson delivery. When

the educator is in the act of teaching the lesson, each decision made during this delivery is based on and compared with the developed lesson plan. Current and ongoing reflection occurs as the lesson progresses, which is articulated as a series of lesson adjustments or improvisational decision-makings that are supported by these immediate or active reflections. Jarvis et al. (1998) described and explained this type of reflection as "reflective practice" (p. 55), where learners are "thinking on their feet." In relation to an educator, he or she delivers a lesson which is supported by prior knowledge and experiences that guide and inform them in making immediate and salient decisions in the current teaching situation. In other words, educators use reflective practice as a method for reflection directly ensconced within the lesson engagement, which brings meaning to their own learning and teaching.

Fiddler and Marienau's (2008) model indicated that reflection is the gateway to meaningful learning, identifying reflection in the form of ideas and theories with respect to the individual and others (p. 82). As such, the educator as an individual learner reflects on his or her own meaningful learning through the memorable points of the lesson. This is indicated within their personal learning styles. Building on this initial reflection, the educator then moves into the teaching role and experiences another level of reflection through the lens of a university educator. Extracting from their personal beliefs, actions, connections, feelings, and significance of the lesson being taught, educators formulate and shape meaningful learning and teaching. Based on Fiddler and Marienau's definitions of experiential learning and learning from experience, the university educator encounters experiential learning through the direct delivery of the lesson, which is a direct involvement of the learning activities being taught in the lesson. Learning from

experience occurs after the direct involvement of learning and enables the educator to reflect upon what is being taught. This type of reflection can be instrumental within the delivery of the lesson, at that moment, or it can be reflection that is stimulated later and after the lesson delivery is completed. In either situation, learning from experience supports the dynamic exchange and transference of knowledge and experience from the educator's perspectives as a learner and as a teacher. These perspectives are articulated within an educator's personal learning styles and instructional choices.

Situating *reflection* in the form of theories and ideas after a learning *experience* is contrary to the standard practice of teaching theories and ideas before learners engaged in learning from experience (Fiddler & Marienau, 2008, p. 83). This process is clearly demonstrated when educators bring their prior personal learning experiences to their lesson development and delivery activities and then apply them within their instructional choices. Salience or "What's got my attention?" (p. 83) regarding their own learning experiences is used to form and shape the content of a lesson. Meaningful learning experiences that educators encountered before becoming an educator add to the rich learning environment that is provided to their students and that supports the scaffolding of their own learning styles.

University educator Case 9 provides an example that supports Fiddler and Marienau's (2008) concept of "the role of others' ideas" (p. 83). In this case, the educator identified the importance of reflection through others' ideas and perceptions and the conjoining of thoughts through a method of questioning with respect to past and current practices and viewpoints. In this educator's example of two songwriters' dialogue, there are a series of searching and analytical questions that assist them in arriving at a decision

about the direction and shape of their songs, both in musicality and in the message

conveyed by words. This type of questioning leads to enriched elaboration of layered

learning—a zone of proximal development (Vygotsky, 1978) embedded within a lesson

framework. Fiddler and Marienau further explained that "instructors' value commitments

often run deep, and they have exerted considerable effort to offer rich community based

learning experiences" (p. 84). Educators are tasked with providing meaningful instruction

by enabling students to intuitively reflect on lesson content. As such, when educators

reflect on their lesson plans and delivery through the lens of their personal learning

styles, there is a responsibility to recognize and understand the nature of their

instructional choices and how these choices affect the lesson and subsequently the overall

course development.

University educators interpreted and applied Kolb's (1984) learning theory/cycle

in their lesson framework. Based on the overall review of previous studies that applied

Kolb's experiential learning theory (ELT) and the Kolb Learning Style Inventory (KLSI),

this current study's use of Kolb's four learning styles as part of its methodology and data

gathering processes reflected a similar outcome, on one level. Similar to previous studies,

Kolb's learning styles were effective in identifying individual styles. However, this

current study was dissimilar and unique in how it applied Kolb's learning styles with

respect to the participant sample (university educators) and the educational framework

within which it was used (a lesson). Kolb's four learning styles provided the basic

structure and descriptions within the framework of the EICLS Inventory (Mazo, 2008).

Subsequently, the framework of the EICLS Inventory was developed to support the

purpose and intent of identifying the learning styles of university educators as they were

applied during a lesson. Kolb's four learning styles of accommodation, assimilation, convergent, and divergent provided a core base of attributes and characteristics that described the learning styles of the university educators who applied these styles within the context of the framework of a lesson: 1) development, 2) delivery, and 3) debriefing. The results of the EICLS Inventory provided insights into university educators' learning styles usage patterns within the framework of a lesson.

Clearly, the foundational theories and concepts that support this study were demonstrated within the inventory responses and the interview transcripts. The findings provided insights in the areas of learning styles, instructional choices, and reflection in relation to university educators. As such, this study provided an extension of knowledge within the discipline of higher education. More specifically, the application of Kolb's (1984) ELT which included his four learning styles provided insights into how university educators applied, adapted, and adopted their personal learning styles within the context of a lesson. Additionally, the act of reflection played an important role in establishing the connection between university educators' early learning styles and their applications within the teacher and instructional designer roles.

Application and adaptation. Teachers' extended application and adaptation of Kolb's learning styles within a lesson framework was demonstrated by the findings. Kolb's (1984) ELT created a foundation, with the four original learning styles embedded within the EICLS Inventory (Mazo, 2008).

Extended application. Kolb's (1984) ELT supported the main focus of this study, which was to determine what learning styles university educators applied within the framework of a lesson when they made instructional choices. Experiential learning occurs

when learners are involved in, are engaged within, and are witnessing the cognitive, social, and environmental aspects of knowledge acquisition. Typically, learners are considered to be in the role of students who seek and gain information, knowledge, and wisdom when learning. However, when a learner enters into the role of an educator, there is a shift that occurs in relation to the ways that his or her personal learning styles are applied.

These educators reported that continuous experiential and observational learning in their early and middle years of school enabled them to entrench their learning styles in their daily activities and to assimilate them into their instructional decisions and teaching practices. Conscious awareness of these formed learning styles enabled educators to reach into their repertoire of learning modes. Kolb's (1984) four learning modes provided four learning mode combinations that could be applied to any learning situation, which included abstract conceptualization, concrete experience, active experimentation, and reflective observation. This was evident when comparing and analyzing the inventory responses and the interview transcript dialogues.

As such, university educators actively extended their learning styles into their instructional choices when they were engaged in the development of a lesson, when they delivered a lesson, and when they reflected and debriefed after a lesson. The overall dominant learning style that was applied by educators for the first two activities of a lesson framework (development and delivery) was accommodation. Educators chose to do this by applying the characteristics and attributes of Kolb's (1984) learning style of accommodation during the creation of their lesson plans, assignments, examples, case studies, and stories to ensure that lesson delivery of the content supported learners.

Educators further extended their learning styles by indicating the dominant style of assimilation when engaged in reflection or debriefing after a lesson was taught. This shift demonstrated the need to revisit and assess the lesson content and the approaches to its delivery. Hence, reflection and debriefing were considered essential to the quality and rigor of lesson planning and delivery. Educators understood that it was a natural evolution of shifting their dominant learning style from accommodation to assimilation because they were directly involved in the review and assessment of their own lesson creation and delivery. Reflections about their lesson enabled them to further extend and subsequently adapt their learning styles to meet their own needs within the role of an educator.

Extended adaptation. Theoretically, Kolb (1984) fundamentally understood the purpose and profundity of the role that adaptation plays in relation to how learners apply their learning styles. This profoundness reaches extensively into the role of the university educator, who draws upon the same or similar attributes that characterize their learning styles. There appeared to be a level of savviness as a university educator about their learning styles that enables them to adapt them within their role. As indicated in Vygotsky's (1978) learning theory and zone of proximal development, university educators are critically and strategically situated within society to fulfill the roles of first a learner and then as an educator. In Vygotsky's zone of proximal development, he described the need for both the learner and the educator to come together and share the experience of learning. University educator Cases 7, 8, and 9 explained how they drew upon their learning experiences as a student, witnessing and experiencing the learning and teaching styles of their former teachers and professors. Observing how they

approached a lesson enabled them to determine what approaches best suited their learning styles. This information helped to shape their own learning style preferences which subsequently assisted in bridging and transferring this knowledge into their own lesson framework.

The lenses of university educators. The university educators I interviewed saw how their individual learning styles affected the ways in which they made instructional choices for a lesson. It was interesting to note that some of the educators expressed a clear connection between their learning styles as a young learner and how their learning experiences informed their choices and subsequently were translated into lesson activities. It was the act of reflection about this relationship that created a sense of knowing their behaviors as learner and educator. The university educators' insights suggest that there exists a progression of how learning styles are first shaped and applied during early learning years, and then how they are translated into their transition from learner to educator. Educators may experience learning first-hand, witnessing how a teacher works with them in the classroom, observing and selecting what works best for their own learning needs. It is these observations and experiences that may enrich their knowledge of how they learn and helped them to understand the evolution of learning preferences as young students. Reflecting on their own lived learning experiences assisted the educators in understanding how they applied them within a lesson framework.

Major Conclusions of the Study

Four quantitative and four qualitative research sub-questions guided the focus of the results, as described in Chapter 4. Based on a comparative analysis and interpretations

of the data, the results from the inventory and interview data were combined to demonstrate and to deepen the understanding of the relationship between the mixed methods approaches and types of data gathered for the study. The following major conclusions describe and explain the core connections between the data types, and how they intersect and support the outcomes of the study. The consolidated data presented key common conclusions that were drawn from the responses reported by the educators. These major conclusions provided insights into the relationship between higher education educators, instructional choices within a lesson framework, and the role of reflection as it is applied during the processes of a lesson.

University Educators' Dominant Learning Styles Remained Consistent in Two of the Three Instructional Activities Within a Lesson Framework

This conclusion was based on data gathered for the following research questions:

1) Do a university educator's dominant learning styles remain constant within the instructional framework of a lesson (development, delivery, and debriefing)? (quantitative)

2) Does a university educator's dominant learning style indicate a specific lesson activity (development, delivery, or debriefing)? (quantitative)

3) How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their learning styles? (qualitative)

Based on the data presented in the EICLS Inventory (Mazo, 2008) results, university educators' dominant learning styles remained consistent during the

development and delivery activities of a lesson framework (quantitative question 1).

Within the five disciplines represented (arts, business, education, sciences, and social

sciences), the accommodation learning style was applied most often by university

educators. Most notable about this consistent application was that educators applied the

accommodation learning style when developing their lessons and continued to apply this

learning style further as they transitioned into the second activity of lesson delivery. This

consistent application of the accommodation style indicates university educators'

awareness that the lessons they create are successful when they truly follow the careful

and rigorous planning processes that set the parameters for their lesson delivery.

However, educators' dominant learning styles changed when they engaged in the

third activity of a lesson framework, which was debriefing or reflecting on the nature and

efficacy of their lesson after its delivery. Overall, more educators applied assimilation as

their dominant learning style during debriefing, which indicated that there is a difference

in the type of cognitive engagement during the third activity of a lesson. Debriefing or

reflecting on a lesson plan and lesson delivery requires a different approach when

considering how a lesson is constructed and developed and when considering its delivery

to the students. The activity of lesson development requires that the educator look

forward or in the future to determine and assess the learning needs of the students. The

activity of lesson delivery requires that the educator be in the present when actively

engaged in providing the lesson. Hence, educators applied the accommodation learning

style consistently in these two activities, responding to their own learning styles

accommodations and then transferring them to their own teaching approaches when

planning and delivering a lesson. However, the act of debriefing or reflecting on lesson

delivery requires that an educator look in the past, with the intent to review processes and to analyze lesson structure and effectiveness for the purpose of potential adaptation, adjustment, and change to improve effectiveness in teaching and learning practices.

Additionally, the combined results of quantitative (Question 2) and qualitative (Question 2) data supported this conclusion by indicating that the applications of university educators' dominant learning styles were consistent and constant with specific lesson activities. The educators' dominant learning styles indicated that the accommodation learning style was dominant within the development and delivery of lesson activities, while the assimilation learning style was dominant within the debriefing lesson activity. Within the context of this study, it can be concluded that university educators applied the same dominant learning style specifically to the development and delivery lesson activities. This suggested that university educators recognized the important relationship that exists between the development of lesson materials and how this content is delivered to students. In general, many of the educators selected instructional choices that accommodated teaching and learning situations. Accommodating learners appears to be a critical approach to successful teaching with university educators. Also, it can be noted that there is a relationship that exists between the role of a university educator and the common dominant personal learning style.

Finally, university educators are similar in applying the same dominant learning style (accommodation) when making instructional choices during the development and delivery activities within a lesson framework. During the debriefing activity of a lesson, university educators differ and are more diverse in their instructional choices by indicating assimilation as their dominant learning style.

Faculty in Four Disciplines Consistently Applied the Accommodation Learning

Style in the First Two Lesson Activities

This conclusion was based on data gathered for two research questions that focused on disciplines:

1) Within a discipline/specialty are there common dominant learning styles applied by university educators within the instructional framework of a lesson (development, delivery, and debriefing)? (quantitative)

2) 2) How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their discipline/specialty? (qualitative)

In general, arts (social sciences), business, education, and fine arts disciplines applied the same instructional choices during the three activities of a lesson, which resulted in the same learning style (accommodation). Educators within the discipline of Sciences deviated from the other disciplines by applying the accommodation learning style during the development of a lesson activity; however, they shifted their learning style applications to 'convergent' during the delivery and debriefing activities. It can be concluded that educators within four core disciplines seek to accommodate teaching and learning practices through the lenses of their educator roles and through the application of their learning styles. In some disciplines, accommodation of teaching and learning is more significant than others; however, each discipline has shown that educators selected instructional choices that support the accommodation learning style in at least one or

more lesson activities. In other words, not one of the disciplines that were represented within the study excluded the accommodation style as a dominant application within one of the three lesson activities.

One Learning Styles Usage Pattern Was Applied More Often by Educators in the Three Lesson Activities

The combined data from the EICLS Inventory (Mazo, 2008) and the interviews provided support for the following two research questions:

1) Are there specific patterns of usage of university educators' dominant learning styles within the instructional framework of a lesson (development, delivery, and debriefing)? (quantitative)

2) What criteria do university educators use to make conscious reflective instructional choices within the framework of a lesson (development, delivery, and debriefing)? (qualitative)

Within the disciplines of business, education, arts (social sciences), and fine arts, Usage Pattern 34 was applied most often by educators than any other usage pattern. While the number of educators was small ($n = 6/38$; 15.7%), this demonstrated a pattern of use that was not currently known regarding university educators and their personal learning styles. As such, additional research and focus on this relationship would provide further insights and awareness.

Regarding criteria, university educators used live situations and examples, critical thinking, problem-based learning, and storytelling when developing, delivering, and debriefing a lesson. Other examples of criteria included the use of writing for deeper

meanings, critiquing and analyzing reflections on lesson content and processes, and balancing theory and practice throughout the lesson for key learning concepts. Table 14 provides a detailed summary of the common criteria that university educators use to make conscious reflective instructional choices within a lesson framework. Three of the seven university educators (42.8%) who were interviewed applied these criteria within the Learning Styles Usage Pattern 34. These combined results indicated that this specific usage pattern was used in practice when developing, teaching, and debriefing a lesson and was further confirmed by verbal descriptions during the interviews. As such, there exist certain learning styles patterns of usage within university educators that are applied within a lesson framework, which require further examination to better understand the link between instructional activities and educators' personal learning styles.

Additional Conclusion in Relation to Teaching Experience

In addition to the consolidated conclusions that were supported by quantitative and qualitative data, one other relevant conclusion emerged from the study, which supported the following qualitative research question: How are the conscious reflective instructional choices of university educators similar or dissimilar within the framework of a lesson (development, delivery, and debriefing) based on their teaching experience?

University educators' range of teaching experience included 5-44 years, which indicated experience had limited influence on instructional choices within the framework of a lesson. As such, it is noted that teaching experience may not be a key factor when selecting instructional choices for a lesson. It can be concluded that the key factor of applied learning styles within a lesson framework may be more significant than

expected. Additional research on the relationship between teaching experience, learning styles, and a lesson framework is required to better understand their connections.

Limitations of the Study

The limitations of this study were within two categories, which included participants and location. Given this study focused on university educators' learning styles and not students' learning styles, this limited the number of participants available for the study. With respect to location, the study included the U.S. and Canada, which did not allow educators to participate from other countries. By only including these two countries, this enabled the data to remain within the context and framework of general teaching practices that are similar in approach. This exclusion approach also assisted in analyzing and providing clarity to the results.

Implications

The implications of this research study are far reaching and extend into various areas of education, learning, and teaching. Reflecting on positive social change, and considering methodological, theoretical, and empirical implications provides insights into the impact that this study presents.

Impact of Positive Social Change

Understanding the influence that educators' learning styles have on learning when selecting and delivering content for courses and lessons is an important aspect of teaching. It is well known that most educators in higher education do not possess formal education in curriculum development and instructional design. Hence, understanding the process of how educators use their learning styles to develop and deliver their course and lesson materials would provide insight into how higher education institutions can support

those educators responsible for curriculum development and course design. As well, this knowledge can potentially be used at the global level, providing understanding of how educators from other cultures and disciplines make instructional choices and how their learning styles influence lesson development, delivery, and debriefing activities. This knowledge can provide best practice considerations for higher education institutions when developing curriculum and designing courses within the context of teaching students. The knowledge learned from this study can potentially enable educators and institutions to engage in positive social change that benefit both academic and social communities.

Pedagogical Implications

Methodological implications of this current study are twofold. First, acquiring basic and core knowledge of higher education educators' personal learning styles is knowledge that higher education institutions and educators can use to improve and enhance instructional choices within a lesson framework (development, delivery, and debriefing). Examining the learning styles usage patterns within a lesson framework of individual educators and of faculty disciplines/specialties can inform them as to how these learning styles affect lessons. When educators understand these patterns of use and subsequently their impact on lesson creation, they are better equipped with affecting changes within their lesson structure. As such, informed educators can adapt instructional choices within a lesson to increase effectiveness in teaching practices and in student learning.

Second, the practice of debriefing or reflecting on a lesson after it is taught is an important finding of this current research study. Adopting and adapting the methodology

of conscious reflection after a lesson is developed and/or delivered fundamentally provides an opportunity for educators to observe their behaviors and subsequently affect positive social change within the classroom. Including reflection as a standard practice for higher education educators so that it becomes part of their everyday teaching methodologies would provide opportunities for teaching innovation and enrichment of lesson content based on these reflections.

Theoretical Implications

A detailed review of instructional theorists, learning styles theorists, and theories and models regarding reflection and learning was conducted for this study in order to establish a foundational understanding of how these three impact each other. The outcome of this review indicated that the instructional theories of Bloom, Gagné, and Reigeluth were applied within the framework of a lesson by the educators the were interviewed. These educators provided examples of actual implementations of instructional theories as they were practiced within the classroom. Regarding learning style theorists, Kolb's (1984) ELT was applied within the EICLS Inventory (Mazo, 2008) and used as a foundational basis from which to determine educators' application of their learning styles during the development, delivery, and debriefing activities of a lesson. Kolb's ELT provided four learning styles that could be used effectively to identify these learning styles. While other learning styles theorists could have been used for this study, Kolb's four learning styles worked effectively within this study. The implications of using the ELT is founded within the theoretical underpinnings of Jung's ([1921] 1971) four personality types and two typologies, which formed the basis of Kolb's ELT. It is this foundation that established Kolb's theory, and it is Jung's and Kolb's theories that

supported this current study. The implications of this current study furthers a deeper

understanding of how learning styles are applied in a role (university educator) within

society that affects significant numbers of individuals (students). Theoretically, this study

identifies the relationship between educators' personal learning styles as they are applied

within a lesson framework. This can potentially change the way higher education

educators make instructional choices for lessons through conscious reflection.

Empirical Implications

Based on the results from the EICLS Inventory (Mazo, 2008), the evidence

indicates that the majority of higher education educators who participated in the

inventory applied the accommodation learning style. The accommodation learning style

was selected by educators as a dominant learning style when engaged in lesson

development and lesson delivery. Evidence also indicated that there was a shift from the

accommodation learning style to the assimilation learning style when educators were

engaged in the act of debriefing or reflection after they were completed with the lesson.

Empirically, this confirmed that there is a specific dominant learning style usage pattern

that is applied by educators across the disciplines that participated. There was also a clear

indication that each discipline/specialty demonstrated its own dominant learning style

usage pattern, some of which did not match the overall usage pattern.

Extension of Knowledge Within the Field of Higher Education

The field of higher education includes a plethora of areas where research has

added to the scholarly discussion of teaching and learning. This study adds to this

conversation by examining how higher education educators make instructional choices

when engaged in lesson creation. Factors that affect these choices include the awareness

of their own learning styles as they were shaped in early learning years, the application of these learning styles within the context of a lesson framework, and the connection between their learning styles and instructional choices through the conscious reflections of post lesson review (debriefing). This study's findings extend the knowledge of learning styles, higher education educators, lesson framework, and conscious reflections. Within the study, there were outcomes that resulted directly from the processes involved in conducting the study. In order to develop the framework, instrument, and structure of the study, the EICLS Inventory (Mazo, 2008) was developed and a set of learning styles usage patterns were created.

The EICLS Inventory was developed. The EICLS Inventory (Mazo, 2008) was developed and applied within the context of higher education educators. This unique instrument was designed specifically for the purpose of determining how educators apply their learning styles during the framework of a lesson (development, delivery, and debriefing). As such, there is no instrument that currently exists that measures an educator's learning style within a lesson framework. The purpose for developing this instrument was to acquire and record university educators' learning styles applications and activities, which subsequently assists in understanding the relationship between educators, their learning styles, and a lesson framework. This extends and adds to the discipline of higher education, with a focus on educators' learning styles. Additionally, this instrument gathers information that results in determining individual (educator) and group (disciplines) learning styles usage patterns.

A set of learning styles usage patterns was created. The results from the EICLS Inventory (Mazo, 2008) were analyzed and then organized into 58 learning styles usage

patterns. These patterns were derived from determining the individual educator's dominant learning styles applications within the framework of a lesson. Then, these dominant learning styles were inserted into a coding system that formed and defined each usage pattern. These unique learning styles usage patterns provide a structure that assists in revealing the way in which educators apply their learning styles based on instructional choices within a lesson framework. The coding system and the set of learning styles usage patterns add new knowledge to the discipline of higher education by enabling educators and researchers to determine and observe the behavior of university educators' applications of their own learning styles. Furthermore, these usage patterns provide insights into the behaviors of groups or clusters of educators based on discipline or specialty in teaching. This knowledge can be used by higher education institutions when designing programs for faculty members for the purpose of increasing awareness of how their learning styles are applied through the processes of developing, delivering, and debriefing a lesson. Lessons are at the core of teaching and learning, providing an opportunity for educators to apply learning styles, to teach curriculum content, and to observe students who are in the process of discovering their own learning styles. Information about learning styles applications during a lesson can assist educators in unpacking the complexities of teaching and learning of both stakeholders—educator and student.

Recommendations

By conducting this study, I began the process of learning more about the relationship between higher education educators application of their own learning styles

within the context of a lesson framework. The following recommendations to increase understanding of this relationship are presented below.

1) Conduct this study, again, as a comparison study or a longitudinal study. This would provide access to greater numbers of the sample population within Canada and the United States. Additionally, a larger sample population would provide greater numbers from which to analyze learning styles usage patterns. This would provide a deeper understanding of the relationship between higher education educators' applications of their learning styles, the activities within a lesson framework, and the importance of reflection in determining the connections.

2) Conduct additional one-on-one interviews with higher education educators to increase the understanding of how conscious reflection is used to inform instructional choices for a lesson and how these choices affect teaching and learning.

3) Conduct an overall review the EICLS Inventory (Mazo, 2008), its coding system, and its learning styles usage patterns. This would offer insights and recommendations for any changes or adjustments to them based on the results of this current study.

Recommendations for Practice

There are a number of ways that the knowledge derived from this research study can be applied in a practical way.

1) Include the use of the EICLS Inventory (Mazo, 2008) as a teaching tool for higher education educators to determine their learning styles and to

understand how they are applied within a lesson framework. The resulting learning styles usage patterns can be used to assist educators in comprehending how they apply and adapt their learning styles for the purpose of adapting teaching behavior in relation to lessons.

2) Develop a series of workshops for higher education educators that increase the knowledge of learning styles, instructional design techniques, and the importance of reflection regarding their learning/teaching approaches.

3) Develop and write a book that explains the use of the EICLS Inventory (Mazo, 2008), its coding system, and its learning styles usage patterns.

4) Create an instructional design tool that supports the processes involved in reflecting on a lesson.

Recommendations for Future Research

1) Develop an institute for educators' learning styles and instructional choices where ongoing research and knowledge acquisition within this area can be continued for the purpose of learning about this relationship.

2) Continue to apply the EICLS Inventory (Mazo, 2008) with various groups of university and post-secondary educators in order to further establish reliability and consistency of results.

3) Establish the framework of a lesson through further research that includes

4) Conduct research that focuses on the structure and activities included within a lesson framework in order to refine the definitions of a lesson's activities. For example, is a lesson framework structured as defined within this current study, the structure of a lesson includes development, delivery, and debriefing.

Conclusion

Higher education educators bring various factors to the processes related to a lesson (development, delivery, and debriefing). One of these factors is their personal learning styles that were shaped as young learners. It is these learning experiences that educators draw upon as a resource from which to develop, teach, and reflect on a lesson that is taught. This current study provides evidence that there is a relationship between a university educator's personal learning style and the consciously reflective instructional choices that they make when researching and developing the content of a lesson. As they create their lessons, they reflect on their past learning experiences that inform them what worked or did not work for their own learning purposes. Educators' learning style preferences were either translated within their own lesson creation or they were rejected based on the learning experiences they had witnessed as learners. Either instructional decision was based on their personal learning style preferences.

The relationship between an educator's personal learning styles and instructional choices can fundamentally change the way a lesson is initially perceived and understood by the educator and then subsequently taught. Understanding this relationship can be established in the third activity of a lesson, debriefing or reflecting on its content and delivery. The role of reflection about a lesson is foundational to identifying personal learning styles through usage patterns and then adapting them to the lesson. This requires knowledge of their learning styles preferences, instructional design knowledge to understand the structure of lessons, and comprehension of the critical role that conscious reflection plays in a lesson framework. As such, a lesson involves an elaborate and complex set of knowledge modules that intrinsically work together.

Fundamentally, there is a need for university educators to seek information that will support them in making informative and effective lessons. This benefits teaching practices and student learning, which are inherent and foundational to supporting the positive social change that university educators are positioned within society to accomplish. This current research study aimed to advance educators' knowledge in attaining one of society's visions and missions.

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Appendix A: Visual Model for Mixed Methods Sequential Explanatory Design

Mixed Methods Sequential Explanatory: QUAN → qual	**Purpose 1:** Using the EICLS Inventory, Identify instructional choices, learning styles, and learning style patterns of university educators	
	Procedures	**Products**
QUAN Data collection	• Convenience sampling of university educators who teach at universities in U.S. and Canada • Online EICLS Inventory measuring: 1) stage (independent variable) within the instructional framework of a lesson, 2) one demographic (independent variable), 3) one resulting learning style (dependent variable), 4) one resulted learning styles usage pattern (dependent variable).	• Sample (n = 38) • Demographics data: gender, age, teaching experience, discipline/specialty • Dominant learning styles within the instructional framework of a lesson • Learning styles usage pattern determined by coding system • Item scores/responses from EICLS Inventory (there are 20 instructional choices; used for structured qualitative interviews)
QUAN Data analysis		
QUAN Results	• group analysis • Descriptive statistics	• Descriptive statistics.
	• Identify and describe three groups in terms of measured variables (4 independent and 5 dependent)	• Description and details of the three stages based on the instructional framework of a lesson (development, delivery, debriefing)
Select participants based on QUAN Results	• Purposeful sample of members of each group with additional consideration for age, gender, teaching experience, and discipline/specialty	• Sample (n = 7)
qual data collection	• Structured interviews based on instructional responses from the EICLS Inventory (there are 20 responses)	• Interview texts that include reflections on the instructional responses (there are 20) the university educator reported when completing the EICLS Inventory
	Purpose 2: Record university educators' reflections, attitudes and rationales that explain their instructional choices made within the EICLS Inventory	
qual data analysis	• Case summary • Within case analysis	• Individual profiles and descriptions of reflections that university educators provided regarding their EICLS Inventory instructional choices (there are 20)
qual results	• Description of cases representing each of the three groups (development, delivery, and debriefing of a lesson)	• Case descriptions
Interpretation of QUAN → qual results	• Report QUAN and qual results by cluster • Discuss QUAN results and how qual findings confirm information within groups	• Describe the dependent variable (learning style) by stage (independent variable). • QUAL confirmation of QUAN results

Appendix B: Educators' Instructional Choices and Their Learning Styles (EICLS)

Inventory

The Educators' Instructional Choices and Their Learning Styles (EICLS)

Inventory (Mazo, 2008) to determine how higher education educators apply their learning

styles when engaged in the instructional framework of a lesson (development, delivery,

and debriefing). It was also designed to determine the educator's pattern of usage with

respect to his or her learning styles within this framework. First, the educator is asked to

complete the inventory which comprises 20 sets of statements. Each set begins with a

statement that is required to be completed by selecting one of four instructional choice

descriptions. These descriptions reflect Kolb's (1984) four learning styles. Kolb's his

experiential learning theory (ELT), learning styles, and learning modes are described

below.

Experiential Learning Theory (ELT)

Kolb (1984) developed his experiential learning theory (ELT) model in order to

explain the connections between human maturational development stages, learning

processes, and learning experiences. Kolb understood that experiences shaped the way

learners grasped knowledge which subsequently affected how they developed

cognitively.

Within the ELT model, Kolb (1984) identified four learning modes which were

paired to create four learning styles.

Four learning styles

1) Convergent learning style (Combined AC/AE learning modes; Kolb, 1984, p. 77):

    Abstract conceptualization (AC; thinking): These learners are focused on logical and sequential ideas and concepts that can be used to create general theories. They approach life from a scientific perspective as opposed to one that is art based. Critical analysis is necessary for understanding concepts and idea systems. Thinking is considered to be more important than feeling.

    Active experimentation (AE; doing). These learners are focused on making a difference in their world by influencing it, with results that indicate change. Doing is considered to be more important than observing.

2) Divergent learning style (Combined CE/RO learning modes; Kolb, 1984, pp. 77-78):

    Concrete experience (CE; feeling): Learners who are orientated towards *concrete experience* relate with people on an immediate level and in real situations. Their approach to life is one of open-mindedness with a focus on the feelings of others around them. Feeling is considered to be more important than thinking.

    R*eflective observation* (RO; watching): Learners who are orientated towards reflective observation are focused on understanding different perspectives and point of views. It is important for these learners to take the time to ponder on

ideas and concepts, rather than to try the practical approach. Reflection is considered to be more important than doing.

3) Assimilation learning style (Combined AC/RO learning modes; Kolb, 1984, p. 77):

Abstract conceptualization (AC; thinking): These learners are focused on logical and sequential ideas and concepts that can be used to create general theories. They approach life from a scientific perspective as opposed to one that is art based. Critical analysis is necessary for understanding concepts and idea systems. Thinking is considered to be more important than feeling.

R*eflective observation* (RO; watching): Learners who are orientated towards reflective observation are focused on understanding different perspectives and point of views. It is important for these learners to take the time to ponder on ideas and concepts, rather than to try the practical approach. Reflection is considered to be more important than doing.

4) Accommodative learning style (Combined CE/AE learning modes; Kolb, 1984, p. 77):

Concrete experience (CE; feeling): Learners who are orientated towards *concrete experience* relate with people on an immediate level and in real situations. Their approach to life is one of open-mindedness with a focus on the feelings of others around them. Feeling is considered to be more important than thinking.

Active experimentation (AE; doing). These learners are focused on making a difference in their world by influencing it, with results that indicate change. Doing is considered to be more important than observing.

Educators' Learning Styles during Lesson Activities

The EICLS Inventory (Mazo, 2008) is designed to determine how an educator applies his or her learning styles when actively engaged in the three main instructional activities of a lesson: development, delivery, and debriefing. The EICLS Inventory structure is outlined below.

- **Parts**: There are three parts to the inventory, each of which include a series of numbered statements about instructional activities in the areas of lesson development, lesson delivery, and lesson debriefing.

- **Statements**: There are 20 numbered statements in total. Under each numbered statement, there is a set of four separate descriptions that identify four different instructional approaches which are based on Kolb's four learning styles:

  - Convergent: abstract conceptualization (AC; thinking) and active experimentation (AE; doing)

  - Divergent: concrete experience (CE; feeling) and reflective observation (RO; watching)

  - Assimilation: abstract conceptualization (AC; thinking) and reflective observation (RO; watching)

  - Accommodative: concrete experience (CE; feeling) and active experimentation (AE; doing)

- **Completion**: To complete the inventory, the educator is asked to read each numbered statement and complete the statement by selecting one of the four descriptions that best suits his or her behavior. When an educator makes a selection, his or her approach to instruction, as well as his or her learning styles are identified.

- **Scoring and Interpretation**: One point is awarded for each selection. The learning style that receives the highest number of points indicates how the educator's dominant learning style is applied as it relates to lesson development, lesson delivery, and lesson debriefing activities.

Scores and Interpretations of Results

The following explains how individual educator's results from the EICLS Inventory (Mazo, 2008) are scored and interpreted.

Scoring

1. **Score 5-7 points:** When each of the four learning styles is within this point range, this indicates a balanced application of all four learning styles.

2. **Score 8-10 points:** When one of the learning styles is within this point range, this indicates a moderate application of one learning style, with the other three learning styles applied less frequently.

3. **Score 11-20 points:** When one of the learning styles is within this point range, this indicates a strong application of one learning style, with the other three learning styles applied less frequently.

Interpretation

1. **Balanced**: If the educator scores 5-7 points in any one learning style, he or she will have applied all four learning styles relatively equal when developing, delivering, and debriefing lessons.

2. **Moderate**: If the educator scores 8-10 points in any one learning style, he or she will have a definite application of one of the four learning styles over the other three learning styles when developing, delivering, and debriefing lessons.

3. **Strong**: If the educator scores 11-20 points in any one learning style, he or she will have a strong application of one of the four learning styles over the other three learning styles when developing, delivering, and debriefing lessons.

Understanding learning styles creates an awareness of how educators approach their own learning processes. This awareness is increased significantly when educators begin to naturally transition their learning styles to lesson activities. The knowledge of how they apply their learning styles to lesson activities can assist educators in effectively creating meaningful learning environments. Go to the Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008) via the link. It is active once the research study is ready to proceed (https://eiclsresearch.wordpress.com/)

Appendix C: Demographic Questions Prior to Beginning EICLS Inventory

Six demographic questions were presented to the participant to obtain criteria for

the purpose of understanding the participant population. To gather this information,

participants completed the EICLS Inventory (Mazo, 2008) and an in-depth interview (for

those participants who agreed to be interviewed). These questions were designed to

identify specific characteristics of the participant as outlined in Chapter 3, as well as

acted as dependent variables in the study. These questions are provided below.

Demographic Questions and Statements

1. *Please indicate your gender.*

   The responses are the following: 1) male, and 2) female

2. *Please specify your age range.*

   The age range provides a clearer understanding of what age groups participated in

   the study and used to determine the number of participants who were situated in

   these age ranges. The responses to this question include the following: 1) 18-25, 2)

   26-35, 3) 36-45, 4) 46-55, 6) 56-65, and 5) 66 or older. The participants are required

   to indicate an age range, or they cannot proceed to the inventory or interview stages

   of the study.

3. *How many years of teaching experience at a university do you have in total?*

   The response to this question is a number which will indicate 1 or more years of

   teaching experience. The responses to this question include the following: 1-5, 6-10,

   11-15, 16-20, and more than 20 years. The participants are required to indicate the

   length of teaching experience, or they cannot proceed to the inventory or interview

   stages of the study.

4. *Have you taught within the last 12 months of this academic year?*

The responses are the following: 1) yes, and 2) no.

This will meet the requirement that the participant has taught during the previous 12 months, ensuring that he or she has been active in teaching with the previous academic year. The participants are required to indicate whether they have taught during the previous 12 months, or they cannot proceed to the inventory or interview stages of the study.

5. *Please identify the name of the university you currently teach at.*

The response to this question is the name of the university that the participant is teaching at. This is a second method of ensuring that the participant teaches at a university, a condition that is required for this study.

6. *What is your primary Discipline and/or Specialty?*

The response to this question is the name of the specific discipline and/or specialty that the participant teaches in. Participants are required to indicate their discipline and/or specialty, or they cannot proceed to the inventory or interview stages of the study. This information is used to determine the area that a university educator is teaching in and is used to determine whether there are similar/dissimilar learning styles usage patterns that identify with specific teaching disciplines and/or specialties.

These questions provided critical information regarding the age and gender of the participants, their institution, their teaching experience, and their teaching disciplines and/or specializations.

Appendix D: Instructional Statements Included in the EICLS Inventory

Upon successful completion of the six demographic questions, participants are allowed to proceed to the inventory part of the study. The Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008) comprises 20 statements grouped into three parts. *Coded units* are indicated through bolded numbers.

Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory

Coded Units	Part I: Lesson Development	Points
	1. When I choose content for a lesson, I like to	
1a	a) Include information that is task-oriented and that focuses on specific problems (C)	1 1
1b	b) Include concrete situations that are viewed from many perspectives (D)	1
1c	c) include theoretical models that bring numerous observations into a cohesive explanation (AS)	1
1d	d) include situations and examples that go beyond theory and apply in different and changing circumstances (AC)	
	2. When I prepare for my lesson, I like to	
2a	a) organize my lesson content around problem based learning (C)	1
2b	b) organize my lesson content around many relationships that create meaning such as people and their accomplishments (D)	1 1
2c	c) organize my lesson content around theory that is logically sound and precise such as enabling students to engage in observations and reflections on the lesson topics in the form of discussion groups (AS)	1
2d	d) organize my lesson content around doing things that involve new experiences and activities that allow students to try things out (AC)	
	3. When I choose materials for my lesson, I	
3a	a) include case scenarios, and problem solving readings that involve decision-making processes (C)	1 1
3b	b) include imaginative examples, stories, and experiences that involve meaning and values (D)	1 1
3c	c) involve theoretical models that provide an explanation of how all of the processes work together (AS)	

3d	d) include descriptions of real-time events and circumstances where students can engage in situational thinking and discussion (AC)	
	4. Before teaching a lesson, I am prepared when I	
4a	a) have problem-solved all eventualities that can occur during lesson delivery (C)	1
		1
4b	b) feel that I have considered all of the content from various perspectives (D)	1
4c	c) have thought through all of the content logically and sequentially (AS)	1
4d	d) have actively experimented with the content topics (AC)	
	Scores:	
	Part I: Lesson Development – Dominant learning style is_____	

	Part II: Lesson Delivery	**Points**
	5. My approach to teaching a lesson generally focuses on	
5a	a) presenting problems that require solutions, decision-making, and practical application (C)	1
		1
5b	b) establishing connections between the people who are within the lesson content and the students' interests in the content (D)	1
		1
5c	c) creating correlations between key theories in the lesson content in order to gain students' interests (AS)	
5d	d) providing opportunities for students to engage in new experiences requiring action (AC)	
	6. In a lesson, it is important for me to ensure that students	
6a	a) experience knowledge through experts in their field (C)	1
6b	b) develop a sense of experiencing problems through solution-based theories, principles, and practices (D)	1
		1
6c	c) observe the outcomes of a theory or principle and reflect on the impact of those outcomes (AS)	1
6d	d) experience learning by actively applying theories and principles through hands-on exercises (AC)	
	7. In a lesson, I interrelate best with students when I	
7a	a) problem-solve with them around an issue (C)	1
7b	b) feel they are intuitively open to learning new ideas (D)	1
7c	c) listen to their ideas and concepts and their responses to questions (AS)	1
7d	d) ask them questions to take them further into a topic (AC)	1

8a	8. In a lesson, I like to create a comfortable learning environment that	1
8b	a) promotes the practical application of ideas (C)	1
8c	b) promotes student interaction and dialogue between each other (D)	1
8d	c) encourages detailed and thorough analyses of ideas and concepts (AS)	1
	d) provides expert and peer discussion and review that supports intuitive, trial-and-error thinking (AC)	
9a	9. When I begin to teach a lesson, I gain my students' attention by	
9b	a) asking students to quiet down to establish order in the lesson environment (C)	1 1
9c	b) waiting until students naturally quiet down and look to me to begin the lesson (D)	1 1
9d	c) observing the students as they enter the learning environment and role-modeling a general state of calm (AS)	
	d) standing at the front of the class and signaling to students that the lesson begins (AC)	
10a	10. During a lesson, I establish rules in my learning environment by	1 1
10b	a) reading them to the students at the beginning of the lesson (C)	1
10c	b) presenting several different scenarios about the rules (e.g. different situations regarding internet usage) (D)	1
10d	c) role modeling them throughout the lesson (AS)	
	d) providing real life examples of the rules (e.g. no plagiarism) (AC)	1
11a	11. I outline the content that will be covered during the lesson by	1
11b	a) writing it on the board (C)	1
11c	b) verbalizing it at the beginning of the lesson (D)	1
11d	c) posing a key question that will be answered throughout the lesson (AS)	
	d) demonstrating the concepts through actual experimentation or role-modeling (AC)	
12a	12. In the lesson, I teach concepts to students by	1
12b	a) offering various problems and solutions on the concept (C)	1
12c	b) introducing the individual who originally developed the concept (D)	1
12d	c) presenting scientific empirical data that supports the concept (AS)	1
	d) assigning practical exercises for students to experience the concept (AC)	
13a	13. In the lesson, I build rapport with students by	1
13b	a) memorizing and using their first names (C)	1
13c	b) acknowledging them through eye contact (D)	1
13d	c) providing time to reflect on ideas for discussion (AS)	1

	d) walking through the learning environment to see if students require assistance during lesson activities (AC)	1
14a	14. In the lesson, I create examples or samples for students to learn from	1
14b	a) through the discussion of problems that require practical solutions (C)	1
14c	b) by providing specific and relevant examples that attach meaning and values to the lesson (D)	1
14d	c) by using students' outcomes from lesson experiments and activities (AS)	
	d) by using real-time situations that are relevant to the lesson (AC)	1
15a	15. In the lesson, I provide interactivity in the learning environment through	1
15b	a) group interaction and presentation of ideas and solutions (C)	1
15c	b) open discussion of various perspectives (D)	1
15d	c) simulation and/or role playing (AS)	
	d) real-time activities (AC)	
16a	16. In the lesson, I seek different viewpoints by	1
	a) thinking out loud some of the possible options that students might consider when pondering a topic (C)	1
16b		1
16c	b) being sensitive to the way students express their ideas (D)	1
	c) asking students to reflect on the various options provided and then asking them to critically analyze these options into a cohesive theme or idea (AS)	
16d	d) providing opportunities for students to listen to or speak to other experts (AC)	
	Scores:	
	Part II: Lesson Delivery – Dominant learning style is_____	

	Part III: Lesson Debriefing	Points
	17. I review after a lesson by	
17a	a) writing down what worked and what did not work for the students (C)	1
17b	b) outlining the key concepts and ideas that were covered to ensure meaningful connections were achieved (D)	1
17c	c) reflecting on the general delivery of the lesson to ensure its approach was logical and precise (AS)	1
17d	d) re-trying some of the exercises that were used in the lesson (AC)	1
	18. I make changes to the lesson by	
18a	a) replacing the existing problem examples used in the lesson with new and current examples (C)	1
18b	b) rereading the narrative samples and stories to ensure that they provide relevant and meaningful connections with the lesson content (D)	1

18c	c) reflecting on the theories and models used in explanations to ensure that they are accurate and relevant (AS)	1 1
18d	d) updating the circumstances within examples to ensure that content is new and in real-time (AC)	
	19. I research content for the next lesson by	
19a	a) locating case scenarios that can be used for problem-solving, decision-making, and then be applied in a practical manner (C)	
19b	b) finding examples where narratives or stories demonstrate relationships that express values (D)	1 1
19c	c) identifying new theories that explain a concept (AS)	1
19d	d) searching out immediate and current circumstances that enable students to problem-solve through trial-and-error	1
	20. I organize the next lesson by	
20a	a) writing notes about what was covered in the previous lesson so that I ensure that I make a good transition to the next lesson (C)	
20b	b) ensuring that the beginning of the next lesson opens with an individual's story that relates to and supports the topic being taught throughout the lesson (D)	1 1
20c	c) ordering the content in a logical and sequential progression so that ideas and concepts flow (AS)	1 1
20d	d) ensuring that there is an activity for students to begin with that applies the previous lesson's concept with the next lesson's learning (AC)	
	Scores:	
	Part III: Lesson Debriefing – Dominant learning style is_____	
21a	Phase II of the Study: Interviews If you are willing to participate in Part II: Interview of this study which involves an interview where you will be asked to reflect upon and explain the choices you made in this inventory, please contact the researcher through the following email address: Researcher email address: _____	

Appendix E: Coding System and Usage Patterns

Usage Patterns of Educators' Learning Styles Within the Instructional Framework of a Lesson

Knowing what learning styles educators apply during the three main lesson activities of development, delivery, and debriefing is one part of the process involved in comprehending how these styles affect teaching and learning. The other part of this process involves tracking the pattern in which these learning styles are applied throughout the three main lesson activities.

In order to track these usage patterns, the results from the Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008) must be recorded using a coding system. This coding system and how it is applied are described and explained below.

Coding System

To determine the usage pattern of an educator's application of his or her dominant learning style (dls) within the framework of each of the three lesson activities (la), (development (a1), delivery (a2), and debriefing (a3)), the following coding system can be used.

$$EICLSup = 3(la \text{ and } dls)$$

Description of coding system:

EICLSup = 3(la and dls)

EICLSup = 3(lesson activity and dominant learning style)

EICLSup = (lesson activity one and dominant learning style) and (lesson activity two and dominant learning style) and (lesson activity three and dominant learning style)

EICLSup or Educators' Instructional Choices and their Learning Styles usage pattern is determined by inserting the three main lesson activities (la) and dominant learning styles (dls) that were recorded in the EICLS Inventory (Mazo, 2008). An example of how the coding system is applied follows.

Applying the Coding System

Allan is a professor at his university where he teaches in the Bachelor of Commerce undergraduate degree. He was asked to complete the EICLS Inventory (Mazo, 2008) in a secured online environment. The following were his results.

Part I: Lesson Development Activity (a1) and Convergent Learning Style (c)

Part II: Lesson Delivery Activity (a2) and Convergent Learning Style (c)

Part III: Lesson Debriefing Activity (a3) and Assimilation Learning Style (as)

To determine the usage pattern of Allan's application of his learning styles during lesson activities, his results can be inserted into the coding system.

EICLSup = (lesson development activity and convergent) and (lesson delivery

activity and convergent) and (lesson debriefing activity and assimilation)

Usage Pattern 3 = (a1)c and (a2)c and (a3)as (Refer to Appendix F)

Allan's usage pattern indicates that he applies a dominant convergent learning style during lesson development and during lesson delivery activities, but uses a dominant assimilation learning style when engaged in the lesson activity of debriefing.

Procedure to apply the coding system:

1. Complete the Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008), which takes approximately 15-20 minutes.

This inventory determines the dominant learning style that the educator uses during each of the three main activities of a lesson: development, delivery, and debriefing.

2. Insert the results from the EICLS Inventory (Mazo, 2008) into the coding system: EICLSup = 3(la and dls) to determine the Usage Pattern of the educator.

3. Refer to Appendix F to view the details of usage patterns.

Appendix F: Educators' Instructional Choices and Their Learning Styles Usage Patterns

Within the Framework of a Lesson (Development, Delivery, and Debriefing)

Lesson Activities Codes:		Learning Styles Codes:	
Lesson Development Activity: (a1)		Convergent Learning Style (c)	
Lesson Delivery Activity: (a2)		Divergent Learning Style (d)	
Lesson Debriefing: (a3)		Assimilation Learning Style (as)	
		Accommodative Learning Style (ac)	
Usage Pattern 1: EICLSup = (a1)c and (a2)c and (a3)c			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and c) and (a2 and c) and (a3 and c)
Usage Pattern 2: EICLSup = (a1)c and (a2)c and (a3)d			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and c) and (a2 and c) and (a3 and d)
Usage Pattern 3: EICLSup = (a1)c and (a2)c and (a3)as			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and c) and (a2 and c) and (a3 and as)
Usage Pattern 4: EICLSup = (a1)c and (a2)c and (a3)ac			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EALSup = a3 and ac lesson debriefing (a3) accommodative (ac)	EICLSup = (a1 and c) and (a2 and c) and (a3 and ac)
Usage Pattern 5: EICLSup = (a1)c and (a2)d and (a3)c			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and c) and (a2 and d) and (a3 and c)
Usage Pattern 6: EICLSup = (a1)c and (a2)as and (a3)c			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and c) and (a2 and as) and (a3 and c)
Usage Pattern 7: EICLSup = (a1)c and (a2)ac and (a3)c			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and c) and (a2 and ac) and (a3 and c)
Usage Pattern 8: EICLSup = (a1)d and (a2)c and (a3)c			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and d) and (a2 and c) and (a3 and c)
Usage Pattern 9: EICLSup = (a1)as and (a2)c and (a3)c			
EICLSup = a1 and as lesson development (a1)	EICLSup = a2 and c lesson delivery (a2)	EICLSup = a3 and c lesson debriefing (a3)	EICLSup =

assimilation (as)	convergent (c)	convergent (c)	(a1 and as) and (a2 and c) and (a3 and c)
Usage Pattern 10: EICLSup = (a1)ac and (a2)c and (a3)c			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and ac) and (a2 and c) and (a3 and c)
Usage Pattern 11: EICLSup = (a1)d and (a2)d and (a3)d			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and d) and (a2 and d) and (a3 and d)
Usage Pattern 12: EICLSup = (a1)d and (a2)d and (a3)c			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and d) and (a2 and d) and (a3 and c)
Usage Pattern 13: EICLSup = (a1)d and (a2)d and (a3)as			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and d) and (a2 and d) and (a3 and as)
Usage Pattern 14: EICLSup = (a1)d and (a2)d and (a3)ac			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and d) and (a2 and d) and (a3 and ac)
Usage Pattern 15: EICLSup = (a1)d and (a2)c and (a3)d			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and d) and (a2 and c) and (a3 and d)
Usage Pattern 16: EICLSup = (a1)d and (a2)as and (a3)d			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 andas lesson delivery (a2) assimilation (as)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and d) and (a2 and as) and (a3 and d)
Usage Pattern 17: EICLSup = (a1)d and (a2)ac and (a3)d			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 andac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and d) and (a2 and ac) and (a3 and d)
Usage Pattern 18: EICLSup = (a1)c and (a2)d and (a3)d			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and c) and (a2 and d) and (a3 and d)
Usage Pattern 19: EICLSup = (a1)as and (a2)d and (a3)d			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and as) and (a2 and d) and (a3 and d)

Usage Pattern 20: EICLSup = (a1)ac and (a2)d and (a3)d			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and ac) and (a2 and d) and (a3 and d)
Usage Pattern 21: EICLSup = (a1)as and (a2)as and (a3)as			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and as) and (a2 and as) and (a3 and as)
Usage Pattern 22: EICLSup = (a1)as and (a2)as and (a3)c			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and as) and (a2 and as) and (a3 and c)
Usage Pattern 23: EICLSup = (a1)as and (a2)as and (a3)d			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and as) and (a2 and as) and (a3 and d)
Usage Pattern 24: EICLSup = (a1)as and (a2)as and (a3)ac			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and as) and (a2 and as) and (a3 and ac)
Usage Pattern 25: EICLSup = (a1)as and (a2)c and (a3)as			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and as) and (a2 and c) and (a3 and as)
Usage Pattern 26: EICLSup = (a1)as and (a2)d and (a3)as			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and as) and (a2 and d) and (a3 and as)
Usage Pattern 27: EICLSup = (a1)as and (a2)ac and (a3)as			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and d lesson delivery (a2) accommodation (ac)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and as) and (a2 and ac) and (a3 and as)
Usage Pattern 28: EICLSup = (a1)c and (a2)as and (a3)as			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and c) and (a2 and as) and (a3 and as)
Usage Pattern 29: EICLSup = (a1)d and (a2)as and (a3)as			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and d) and (a2 and as) and (a3 and as)
Usage Pattern 30: EICLSup = (a1)ac and (a2)as and (a3)as			
EICLSup = a1 and ac lesson development (a1)	EICLSup = a2 and as lesson delivery (a2)	EICLSup = a3 and as lesson debriefing (a3)	EICLSup =

accommodation (ac)	assimilation (as)	assimilation (as)	(a1 and ac) and (a2 and as) and (a3 and as)
Usage Pattern 31: EICLSup = (a1)ac and (a2)ac and (a3)ac			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and ac) and (a2 and ac) and (a3 and ac)
Usage Pattern 32: EICLSup = (a1)ac and (a2)ac and (a3)c			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and ac) and (a2 and ac) and (a3 and c)
Usage Pattern 33: EICLSup = (a1)ac and (a2)ac and (a3)d			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and c lesson debriefing (a3) divergent (d)	EICLSup = (a1 and ac) and (a2 and ac) and (a3 and d)
Usage Pattern 34: EICLSup = (a1)ac and (a2)ac and (a3)as			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and ac) and (a2 and ac) and (a3 and as)
Usage Pattern 35: EICLSup = (a1)ac and (a2)c and (a3)ac			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and ac) and (a2 and c) and (a3 and ac)
Usage Pattern 36: EICLSup = (a1)ac and (a2)d and (a3)ac			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and ac) and (a2 and d) and (a3 and ac)
Usage Pattern 37: EICLSup = (a1)ac and (a2)as and (a3)ac			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and ac) and (a2 and as) and (a3 and ac)
Usage Pattern 38: EICLSup = (a1)c and (a2)ac and (a3)ac			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and c) and (a2 and ac) and (a3 and ac)
Usage Pattern 39: EICLSup = (a1)d and (a2)ac and (a3)ac			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and d) and (a2 and ac) and (a3 and ac)
Usage Pattern 40: EICLSup = (a1)as and (a2)ac and (a3)ac			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and as) and (a2 and ac) and (a3 and ac)

Usage Pattern 41: EICLSup = (a1)c and (a2)dand (a3)as			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and c) and (a2 and d) and (a3 and as)
Usage Pattern 42: EICLSup = (a1)c and (a2)as and (a3)d			
EICLSup = a1 and c lesson development (a1) convergent (d)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and c) and (a2 and as) and (a3 and d)
Usage Pattern 43: EICLSup = (a1)c and (a2)d and (a3)ac			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and c) and (a2 and d) and (a3 and ac)
Usage Pattern 44: EICLSup = (a1)c and (a2)ac and (a3)d			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and c) and (a2 and ac) and (a3 and d)
Usage Pattern 45: EICLSup = (a1)d and (a2)c and (a3)as			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and d) and (a2 and c) and (a3 and as)
Usage Pattern 46: EICLSup = (a1)d and (a2)as and (a3)c			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and d) and (a2 and as) and (a3 and c)
Usage Pattern 47: EICLSup = (a1)d and (a2)c and (a3)ac			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and ac lesson debriefing (a3) accommodation (ac)	EICLSup = (a1 and d) and (a2 and c) and (a3 and ac)
Usage Pattern 48: EICLSup = (a1)d and (a2)ac and (a3)c			
EICLSup = a1 and d lesson development (a1) divergent (d)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and d) and (a2 and ac) and (a3 and c)
Usage Pattern 49: EICLSup = (a1)as and (a2)c and (a3)d			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and as) and (a2 and c) and (a3 and d)
Usage Pattern 50: EICLSup = (a1)as and (a2)d and (a3)c			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and as) and (a2 and d) and (a3 and c)
Usage Pattern 51: EICLSup = (a1)as and (a2)c and (a3)ac			
EICLSup = a1 and as lesson development (a1)	EICLSup = a2 and c lesson delivery (a2)	EICLSup = a3 and ac lesson debriefing (a3)	EICLSup =

assimilation (as)	convergent (c)	accommodation (ac)	(a1 and as) and (a2 and c) and (a3 and ac)
Usage Pattern 52: EICLSup = (a1)as and (a2)ac and (a3)c			
EICLSup = a1 and as lesson development (a1) assimilation (as)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and as) and (a2 and ac) and (a3 and c)
Usage Pattern 53: EICLSup = (a1)ac and (a2)c and (a3)d			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and d lesson debriefing (a3) divergent (d)	EICLSup = (a1 and ac) and (a2 and c) and (a3 and d)
Usage Pattern 54: EICLSup = (a1)ac and (a2)d and (a3)c			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and ac) and (a2 and d) and (a3 and c)
Usage Pattern 55: EICLSup = (a1)ac and (a2)c and (a3)as			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and c lesson delivery (a2) convergent (c)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and ac) and (a2 and c) and (a3 and as)
Usage Pattern 56: EICLSup = (a1)ac and (a2)as and (a3)c			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) convergent (c)	EICLSup = (a1 and ac) and (a2 and as) and (a3 and c)
Usage Pattern 57: EICLSup = (a1)ac and (a2)d and (a3as			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and d lesson delivery (a2) divergent (d)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and ac) and (a2 and d) and (a3 and as)
Usage Pattern 58: EICLSup = (a1)ac and (a2)as and (a3)d			
EICLSup = a1 and ac lesson development (a1) accommodation (ac)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) divergent (d)	EICLSup = (a1 and ac) and (a2 and as) and (a3 and d)
Usage Pattern 59: EICLSup = (a1)c and (a2)ac and (a3)as			
EICLSup = a1 and c lesson development (a1) convergent (c)	EICLSup = a2 and ac lesson delivery (a2) accommodation (ac)	EICLSup = a3 and as lesson debriefing (a3) assimilation (as)	EICLSup = (a1 and c) and (a2 and ac) and (a3 and as)
Usage Pattern 60: EICLSup = (a1)d and (a2)as and (a3)ac			
EICLSup = a1 and ac lesson development (a1) divergent (d)	EICLSup = a2 and as lesson delivery (a2) assimilation (as)	EICLSup = a3 and c lesson debriefing (a3) accommocation (ac)	EICLSup = (a1 and d) and (a2 and as) and (a3 and ac)
Usage Pattern 61: EICLSup = (a1)nr and (a2)nr and (a3)nr			
EICLSup = a1 and nr lesson development (a1) no response (nr)	EICLSup = a2 and nr lesson delivery (a2) no response (nr)	EICLSup = a3 and nr lesson debriefing (a3) divergent (nr)	EICLSup = (a1 and nr) and (a2 and nr) and (a3 and nr)

Appendix G: Prior Application of the Inventory

In order to provide a basic level of application for the Educators' Instructional Choices and Their Learning Styles (EICLS) Inventory (Mazo, 2008), it was used in a study that compared learning styles and communication styles (Mazo & Thira, 2013). A brief description of the study follows.

The EICLS Inventory was developed in 2008 as part of my PhD program and was reviewed by the initial Chair of the dissertation committee. In 2011, the inventory was approved by the Research Ethics Board as part of a study that I conducted at MacEwan University where I teach. The study provided a preliminary level of use that assisted in affirming the statements of the inventory and in providing its prior application to this current study.

Title: Relationship between University Educators' Learning and Communication Styles

Purpose of the Study

The purpose of this quantitative study was to identify, determine, and explain the relationship between university educators' learning styles and communication styles as they are applied in lesson activities. As well, the study aimed to identify dominant learning and communication styles of university educators during lesson development, delivery, and debriefing. The knowledge derived from this study can be utilized by educators when creating lesson plans, when teaching in the classroom, and when reflecting (debriefing) on the outcome after their lesson delivery (debriefing).

Method of the Study

      This study collected quantitative data in a secured online environment using the

Educators' Application of Their Learning and Communication Styles (EALCS) Inventory

(Mazo & Thira, 2013) to capture information about university educators' applications of

their communication and learning styles during lesson activities. The usage patterns used

in this study combined *both* dominant learning and communication styles.

      Research Questions. 1) Are there connections between university professors'

learning and communication styles during lesson activities?; and 2) Are there specific

patterns of usage of professors' dominant learning and communication styles during

lesson activities?

Theoretical Base

      In this study, Kolb's (1984) four learning modes and styles were articulated in the

form of statements that constituted questions 1-18 in the EALCS Inventory (Mazo &

Thira, 2013). Additionally, Alessandra's and O'Connor's (1998) four communication

styles were articulated in the form of statements that constituted questions 19-36 in the

EALCS Inventory. When university professors completed this part of the inventory, the

result was an identification of their learning styles and communication styles and how

these styles were applied during lesson activities. Kolb's four learning styles were

compared to the four communication styles to determine if there was a relationship

between these two styles.

Population and Data Collection

      Research population. Data collected from the EALCS Inventory (Mazo & Thira,

2013) were obtained from 72 university educators who taught at MacEwan University,

Edmonton, Alberta, Canada. These educators derived from four faculties: business, arts

and sciences, fine arts and communications, and health and community studies. As well,

all of these educators had taught at the university within the previous twelve months, to

ensure that they had been engaged in lesson activities.

Data collection process. This study collected quantitative data for 8 weeks using

a secured online environment where the EALCS Inventory (Mazo & Thira, 2013) was

made accessible to university educators who took approximately 15-20 minutes to

complete it. The inventory was designed using a combination of Kolb's (1984) learning

styles and Alessandra's and O'Connor's (1998) communication styles, which assisted in

shaping and formulating the 36 sets of statements comprised within it. A research

assistant was employed to facilitate the data collection process and to ensure there was

anonymity between the researcher (myself) and the research participants.

Results

Research question 1. *Are there connections between university educators'*

communication and learning styles when engaged in lesson activities? There were three

connections that were evident in this study. The *first* connection existed between activity

one (development of a lesson) and activity two (delivery of a lesson) where the same

dominant usage pattern had been applied. More specifically, when university educators

developed the structure, content, and direction of a lesson and when they delivered this

instructional material in the classroom, an average of 69% ($n = 72$) applied the

convergent learning style and an average of 61% ($n = 72$) of university educators applied

the promoter/socializer communication style. This indicated that when these university

educators transitioned from their role as lesson developer to their role as lesson teacher,

the majority of the educators retained the same dominant learning and communication styles. This also suggested that there was a significant level of consistency between the processes of lesson creation and teaching.

The *second* connection existed when these university educators transitioned from teaching activity two (delivery of a lesson) to the third lesson activity of reviewing (debriefing). Seventy-one percent ($n = 72$; DCS 4) and 85% ($n = 72$, DLS 1) of the university educators who participated in the study applied the usage pattern 11 which consisted of using the dominant the dominant learning style of assimilation and communication style of an analyzer/thinker. This indicated a clear shift in the dominant learning and communication styles application when university educators moved into the third lesson activity.

The *third* connection existed between the common attributes of the dominant learning and communication styles that were applied by university educators. When comparing the common attributes of the usage pattern three, there emerged two critical attributes that were shared by the convergent learning style and the promoter/socializer communication style: harmonizing various and many ideas, and seeking and valuing others' ideas. This suggested that the connection that existed between the dominant learning style and communication style applied by university educators during lesson activities was also based on common attributes that may be used as a collaborative support system in order to establish a level of interconnectedness and consistency within a lesson. This connectedness also suggested that there is a relationship between these two types of styles that is required for a successful flow of lesson ideas and content when

transitioning from activity one (development of a lesson) to activity two (delivery of a lesson.

    Research question 2: *Are there specific patterns of usage of university educators' communication and learning styles during lesson activities?* Two specific dominant patterns of usage (learning and communication) were identified that the university educators applied during this study. Usage pattern three was applied as the dominant pattern throughout lesson development and delivery activities. This indicated that an average of 70% ($n = 72$) of university educators applied this pattern within two-thirds of the activities. Usage pattern 11 was the dominant pattern applied in activity three, which indicated a fundamental shift in the application of dominant learning and communication styles. This shift from pattern 3 to pattern 11 suggested that educators applied their styles of learning and communication differently when engaged in the debriefing function of a lesson where deeper reflection and contemplation occurred.

Conclusion

    Learning and communication styles are critical factors to consider when university educators are engaged in lesson activities. These styles can be applied collaboratively by way of common attributes that are comprised within each style. This shared approach between the two types of styles indicates that the relationship between learning and communication is critical in educational activities.

    Connections between style usage patterns indicated that an average of 70% ($N = 72$) of the university educators in this study applied the same pattern (usage pattern 3) when creating lessons and selecting instructional materials, as well as when delivering lesson content through classroom teaching. Hence, this suggested that the transition

between lesson development and delivery activities presents the need for a significant

bridging of ideas and content. However, a shift occurred when the university educators in

this study transitioned from the delivery activity of a lesson to the debriefing activity of a

lesson. The dominant communication and learning styles usage pattern shifted from

pattern 3 (promoter/socializer and convergent) that was applied in the first two activities

of a lesson, to pattern 11 (analyser/thinker and assimilation) that was applied in the third

activity of a lesson. This shift indicated that the application of styles relating to the

creation and teaching of a lesson is different than the application of styles relating to the

process of reflection after a lesson.

Future Research

The relationship that exists between university educators' communication and

learning styles is an important and critical one to understand in terms of its impact on

lesson activities. As such, additional and similar research is required to further explore

the depth of this relationship.

Appendix H: Part II—Qualitative Interviews

In-depth Interview Questions Based on the EICLS Inventory Responses

The following provides a list of interview questions that will be used during the in-depth interviews with participants. They follow the instructional framework of a lesson which constitutes the three parts of the EICLS Inventory (Mazo, 2008), and includes development, delivery, and debriefing. University educators will be asked to provide and explain their reflections, attitudes, and rationales for making their choices on the EICLS Inventory.

1. For inventory statement 1 "When I choose content for a lesson, I like to…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
   a) Include information that is task-oriented and that focuses on specific problems (C)
   b) Include concrete situations that are viewed from many perspectives (D)
   c) include theoretical models that bring numerous observations into a cohesive explanation (AS)
   d) include situations and examples that go beyond theory and apply in different and changing circumstances (AC)

2. For inventory statement 2 "When I prepare for my lesson, I like to…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
   a) organize my lesson content around problem based learning (C)
   b) organize my lesson content around many relationships that create meaning such as people and their accomplishments (D)
   c) organize my lesson content around theory that is logically sound and precise such as enabling students to engage in observations and reflections on the lesson topics in the form of discussion groups (AS)
   d) organize my lesson content around doing things that involve new experiences and activities that allow students to try things out (AC)

3. For inventory statement 3 "When I choose materials for my lesson, I…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) include case scenarios, and problem solving readings that involve decision-making processes (C)

b) include imaginative examples, stories, and experiences that involve meaning and values (D)

c) involve theoretical models that provide an explanation of how all of the processes work together (AS)

d) include descriptions of real-time events and circumstances where students can engage in situational thinking and discussion (AC)

4. For inventory statement 4 "Before teaching a lesson, I am prepared when I…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) have problem-solved all eventualities that can occur during lesson delivery (C)

b) feel that I have considered all of the content from various perspectives (D)

c) have thought through all of the content logically and sequentially (AS)

d) have actively experimented with the content topics (AC)

Part II: Lesson Delivery

5. For inventory statement 5 "My approach for teaching a lesson generally focuses on…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) presenting problems that require solutions, decision-making, and practical application (C)

b) establishing connections between the people who are within the lesson content and the students' interests in the content (D)

c) creating correlations between key theories in the lesson content in order to gain students' interests (AS)

d) providing opportunities for students to engage in new experiences requiring action (AC)

6. For inventory statement 6, "In a lesson, it is important for me to ensure that students…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) experience knowledge through experts in their field (C)

b) develop a sense of experiencing problems through solution-based theories, principles, and practices (D)

c) observe the outcomes of a theory or principle and reflect on the impact of those outcomes (AS)

    d)   experience learning by actively applying theories and principles through hands-on exercises (AC)

7. For inventory statement 7, "In a lesson, I interrelate best with students when I" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
   a) problem-solve with them around an issue (C)
   b) feel they are intuitively open to learning new ideas (D)
   c) listen to their ideas and concepts and their responses to questions (AS)
   d) ask them questions to take them further into a topic (AC)

8. For inventory statement 8, "In a lesson, I like to create a comfortable learning environment that…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
   a) promotes the practical application of ideas (C)
   b) promotes student interaction and dialogue between each other (D)
   c) encourages detailed and thorough analyses of ideas and concepts (AS)
   d) provides expert and peer discussion and review that supports intuitive, trial-and-error thinking (AC)

9. For inventory statement 9, "When I begin to teach a lesson, I gain my students' attention by…" you selected (include participant's recorded response here which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
   a) asking students to quiet down to establish order in the lesson environment (C)
   b) waiting until students naturally quiet down and look to me to begin the lesson (D)
   c) observing the students as they enter the learning environment and role-modeling a general state of calm (AS)
   d) standing at the front of the class and signaling to students that the lesson begins (AC)

10. For inventory statement 10, "During a lesson, I establish rules in my learning environment by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?
    a) reading them to the students at the beginning of the lesson (C)
    b) presenting several different scenarios about the rules (e.g. different situations regarding internet usage) (D)
    c) role modeling them throughout the lesson (AS)

d) providing real life examples of the rules (e.g. no plagiarism) (AC)

11. For inventory statement 11, "I outline the content that will be covered during the lesson by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) writing it on the board (C)
   b) verbalizing it at the beginning of the lesson (D)
   c) posing a key question that will be answered throughout the lesson (AS)
   d) demonstrating the concepts through actual experimentation or role-modeling (AC)

12. For inventory statement 12, "In the lesson, I teach concepts to students by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) offering various problems and solutions on the concept (C)
   b) introducing the individual who originally developed the concept (D)
   c) presenting scientific empirical data that supports the concept (AS)
   d) assigning practical exercises for students to experience the concept (AC)

13. For inventory statement 13, "In the lesson, I build rapport with students by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) memorizing and using their first names (C)
   b) acknowledging them through eye contact (D)
   c) providing time to reflect on ideas for discussion (AS)
   d) walking through the learning environment to see if students require assistance during lesson activities (AC)

14. For inventory statement 14, "In the lesson, I create examples or samples for students to learn from …" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) through the discussion of problems that require practical solutions (C)
   b) by providing specific and relevant examples that attach meaning and values to the lesson (D)
   c) by using students' outcomes from lesson experiments and activities (AS)
   d) by using real-time situations that are relevant to the lesson (AC)

15. For inventory statement 15, "In the lesson, I provide interactivity in the learning environment through…" you selected (include participant's recorded response here, which includes one of the

following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) group interaction and presentation of ideas and solutions (C)

b) open discussion of various perspectives (D)

c) simulation and/or role playing (AS)

d) real-time activities (AC)

16. For inventory statement 16, "In the lesson, I seek different viewpoints by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) thinking out loud some of the possible options that students might consider when pondering a topic (C)

b) being sensitive to the way students express their ideas (D)

c) asking students to reflect on the various options provided and then asking them to critically analyze these options into a cohesive theme or idea (AS)

d) providing opportunities for students to listen to or speak to other experts (AC)

Part III: Lesson Debriefing

17. For inventory statement 17, "I review after a lesson by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) writing down what worked and what did not work for the students (C)

b) outlining the key concepts and ideas that were covered to ensure meaningful connections were achieved (D)

c) reflecting on the general delivery of the lesson to ensure its approach was logical and precise (AS)

d) re-trying some of the exercises that were used in the lesson (AC)

18. For inventory statement 18, "I make changes to the lesson by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

a) replacing the existing problem examples used in the lesson with new and current examples (C)

b) rereading the narrative samples and stories to ensure that they provide relevant and meaningful connections with the lesson content (D)

c) reflecting on the theories and models used in explanations to ensure that they are accurate and relevant (AS)

d) updating the circumstances within examples to ensure that content is new and in real-time (AC)

19. For inventory statement 19, "I research content for the next lesson by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) locating case scenarios that can be used for problem-solving, decision-making, and then be applied in a practical manner (C)

   b) finding examples where narratives or stories demonstrate relationships that express values (D)

   c) identifying new theories that explain a concept (AS)

   d) searching out immediate and current circumstances that enable students to problem-solve through trial-and-error

20. For inventory statement 20, "I organize the next lesson by…" you selected (include participant's recorded response here, which includes one of the following instructional choices below). Can you expand, provide insights, or reflections about your response?

   a) writing notes about what was covered in the previous lesson so that I ensure that I make a good transition to the next lesson (C)

   b) ensuring that the beginning of the next lesson opens with an individual's story that relates to and supports the topic being taught throughout the lesson (D)

   c) ordering the content in a logical and sequential progression so that ideas and concepts flow (AS)

   d) ensuring that there is an activity for students to begin with that applies the previous lesson's concept with the next lesson's learning (AC)

Appendix I: EICLS Inventory—Part I: Development of a Lesson (Questions 1-4)

Participant Statistics

The following includes detailed statistics of Part I: Development of a Lesson

questions that were included in the EICLS Inventory (Mazo, 2008).

Table I1

EICLS Inventory: Question 1 (Participant Statistics)

1. When I choose content for a lesson, I like to		
Answer	Count	%
include information that is task-oriented and that focuses on specific problems (1)	6	15.7
include concrete situations that are viewed from many perspectives (2)	9	23.6
include theoretical models that bring numerous observations into a cohesive explanation (3)	1	2.6
include situations and examples that go beyond theory and apply them in different and changing circumstances (4)	20	52.6
no response (5)	2	5.2

Table I2

EICLS Inventory: Question 2 (Participant Statistics)

2. When I prepare for my lesson, I like to		
Answer	Count	%
organize my lesson content around problem based learning (1)	8	21.0
organize my lesson content around many relationships that create meaning such as people and their accomplishments (2)	3	7.8
organize my lesson content around theory that is logically sound and precise such as enabling students to engage in observations and reflections on the lesson topics in the form of discussion groups (3)	10	26.3
organize my lesson content around doing things that involve new experiences and activities that allow students to try things out (4)	15	39.4
no response (5)	2	5.2

Table I3

EICLS Inventory: Question 3 (Participant Statistics)

3. When I choose materials for my lesson, I		
Answer	Count	%
include case scenarios and problem-solving readings that involve decision-making processes (1)	11	28.9
include imaginative examples, stories, and experiences that involve meaning and values (2)	6	15.7
include theoretical models that provide an explanation of how all of the processes work together (3)	5	13.1
include descriptions of real-time events and circumstances where students can engage in situational thinking and discussion (4)	15	39.4
no response (5)	1	2.6

Table I4

EICLS Inventory: Question 4 (Participant Statistics)

4. Before teaching a lesson, I am prepared when I		
Answer	Count	%
have problem-solved all eventualities that can occur during the delivery of the lesson (1)	2	5.2
feel that I have considered all of the content from various perspectives (2)	14	36.8
have thought through all of the content logically and sequentially (3)	14	36.8
have actively experimented with the content topics (4)	8	21.0
no response (5)	0	0.0

Appendix J: EICLS Inventory—Part II: Delivery of a Lesson (Questions 5-16)

Participant Statistics

The following includes detailed statistics of Part II: Delivery of a Lesson

questions that were included in the EICLS Inventory (Mazo, 2008).

Table J1

EICLS Inventory: Question 5 (Participant Statistics)

5. My approach to teaching a lesson generally focuses on		
Answer	Count	%
presenting problems that require solutions, decision-making processes, and practical applications (1)	13	34.2
establishing connections between the people who are within the lesson content and the students' interest in the content (2)	3	7.8
creating correlations between key theories in the lesson content in order to gain students' interests (3)	6	15.7
providing opportunities for students to engage in new experiences that require action (4)	15	39.4
no response (5)	1	2.6

Table J2

EICLS Inventory: Question 6 (Participant Statistics)

6. In a lesson, it is important for me to ensure that students		
Answer	Count	%
develop a sense of experiencing problems through solution-based theories, principles, and practices (1)	12	31.5
experience knowledge through experts in their field (2)	0	0.0
observe the outcomes of a theory or principle and reflect on the impact of those outcomes (3)	3	7.8
experience learning by actively applying theories and principles through hands-on exercises (4)	22	57.8
no response (5)	1	2.6

Table J3

EICLS Inventory: Question 7 (Participant Statistics)

7. In a lesson, I interrelate best with students when I		
Answer	Count	%
when I problem-solve with them around an issue (1)	9	23.6
feel they are intuitively open to learning new ideas (2)	3	7.8
listen to their ideas and concepts and their responses to questions (3)	12	31.5
ask them questions to take them further into a topic (4)	13	34.2
no response (5)	1	2.6

Table J4

EICLS Inventory: Question 8 (Participant Statistics)

8. In a lesson, I like to create a comfortable learning environment that		
Answer	Count	%
promotes the practical application of ideas (1)	15	39.4
promotes student interaction and dialogue between each other (2)	14	36.8
encourages detailed and thorough analyses of ideas and concepts (3)	3	7.8
provides expert and peer discussion and review that supports intuitive, trial-and-error thinking (4)	5	13.1
no response (5)	1	2.6

Table J5

EICLS Inventory: Question 9 (Participant Statistics)

9. When I begin a lesson, I gain my students' attention by		
Answer	Count	%
asking students to quiet down to establish order in the lesson environment (1)	4	10.5
waiting until students naturally quiet down and look to me to begin the lesson (2)	3	7.8
observing the students as they enter the learning environment and role-modeling a general state of calm (3)	13	34.2
standing at the front of the learning environment and signaling to students that the lesson is to start (4)	15	39.4
no response (5)	3	7.8

Table J6

EICLS Inventory: Question 10 (Participant Statistics)

10. During a lesson, I establish rules in my learning environment by		
Answer	Count	%
reading the rules to the students at the beginning of the lesson (1)	6	15.7
presenting several different scenarios about the rules (e.g. different situations regarding internet usage) (2)	4	10.5
role modeling the rules throughout the lesson (3)	7	18.4
providing real life examples of the rules (e.g. no plagiarism) (4)	16	42.1
no response (5)	5	13.1

Table J7

EICLS Inventory: Question 11 (Participant Statistics)

11. I outline the content that will be covered during the lesson by		
Answer	Count	%
writing the content outline on the board at the beginning and/or throughout the lesson (1)	12	31.5
verbalizing the content outline at the beginning of the lesson (2)	9	23.6
posing a key question at the beginning of the lesson that will be answered throughout the lesson (3)	5	13.1
demonstrating the concepts being taught throughout the lesson through actual experimentation or role-modeling (4)	9	23.6
no response (5)	3	7.8

Table J8

EICLS Inventory: Question 12 (Participant Statistics)

12. In the lesson, I teach concepts to my students by		
Answer	Count	%
offering various problems and solutions on the concept (1)	11	28.9
introducing the individual who originally developed the concept (2)	2	5.2
presenting scientific empirical data that supports the concept (3)	4	10.5
assigning practical exercises for students to experience the concept (4)	18	47.3
no response (5)	3	7.8

Table J9

EICLS Inventory: Question 13 (Participant Statistics)

13. In the lesson, I build rapport with students by		
Answer	Count	%
memorizing and using students' individual names (1)	11	28.9
acknowledging students through eye contact (2)	8	21.0
providing students time to reflect on ideas for discussion (3)	5	13.1
walking through the learning environment to see if students require assistance during lesson activities (4)	10	26.3
no response (5)	4	10.5

Table J10

EICLS Inventory: Question 14 (Participant Statistics)

14. In the lesson, I create examples or samples for students to learn from		
Answer	Count	%
through the discussion of problems that require practical solutions (1)	6	15.7
by providing specific and relevant examples that attach meaning and values to the lesson (2)	18	47.3
by using students' outcomes from lesson experiments and activities (3)	6	15.7
by using real-time situations that are relevant to the lesson (4)	6	15.7
no response (5)	2	5.2

Table J11

EICLS Inventory: Question 15 (Participant Statistics)

15. In the lesson, I provide interactivity in the learning environment through		
Answer	Count	%
group interaction and presentation of ideas and solutions (1)	13	34.2
open discussion of various perspectives (2)	16	42.1
simulation and/or role playing (3)	2	5.2
real-time activities (4)	5	13.1
no response (5)	2	5.2

Table J12

EICLS Inventory: Question 16 (Participant Statistics)

16. In the lesson, I seek different viewpoints by		
Answer	Count	%
thinking out loud some of the possible options that students might consider when pondering a topic (1)	4	10.5
being sensitive to the way students express their ideas (2)	12	31.5
asking students to reflect on the various options provided and then asking them to critically analyze these options in a cohesive theme or idea (3)	18	47.3
providing opportunities for students to listen to or to speak to other experts (4)	2	5.2
no response (5)	2	5.2

Appendix K: EICLS Inventory—Part III: Debriefing of a Lesson (Questions 17-20)

Participant Statistics

The following includes detailed statistics of Part III: Debriefing of a Lesson

questions that were included in the EICLS Inventory (Mazo, 2008).

Table K1

EICLS Inventory: Question 17 (Participant Statistics)

17. I review after a lesson by		
Answer	Count	%
writing down what worked and what did not work for the students (1)	7	18.4
outlining the key concepts and ideas that were covered to ensure meaningful connections were achieved (2)	9	23.6
reflecting on the general delivery of the lesson to ensure its approach was logical and precise (3)	15	39.4
re-trying some of the exercises that were used in the lesson (4)	3	7.8
no response (5)	4	10.5

Table K2

EICLS Inventory: Question 18 (Participant Statistics)

18. I make changes to the lesson by		
Answer	Count	%
replacing the existing problem examples used in the lesson with new and current examples (1)	10	26.3
rereading the narrative samples and stories to ensure that they provide relevant and meaningful connections with the lesson content (2)	5	13.1
reflecting on the theories and models used in explanations to ensure that they are accurate and relevant (3)	4	10.5
updating the circumstances within examples to ensure that concept is new and in real-time (4)	16	42.1
no response (5)	3	7.8

Table K3

EICLS Inventory: Question 19 (Participant Statistics)

19. I research content for the next lesson by		
Answer	Count	%
locating case scenarios that can be used for problem-solving, decision-making, and then the applied in a practical manner (A1)	11	28.9
finding examples where narratives or stories demonstrate relationships that express values (A2)	9	23.6
identifying new theories that explain a concept (A3)	2	5.2
searching out immediate and current circumstances that enable students to problem-solve through trial-and-error (A4)	12	31.5
no response (A5)	4	10.5

Table K4

EICLS Inventory: Question 20 (Participant Statistics)

20. I organize the next lesson by		
Answer	Count	%
writing notes about what was covered in the previous lesson so that I ensure that I make a good transition to the next lesson (A1)	5	13.1
ensuring that the beginning of the next lesson opens with an individual's story that relates to and supports the topic being taught throughout the lesson (A2)	4	10.5
ordering the content in a logical and sequential progression so that ideas and concepts flow (A3)	18	47.3
ensuring that there is an activity for students to begin with that applies the previous lesson's concept with the next lesson's learning (A4)	8	21.0
no response (A5)	3	7.8

Appendix L: Study Part II: Interview Participant Transcripts (Sample)

The following includes a sample of a detailed transcript of one of the seven

participants who were interviewed for this study.

Study: University Educators' Instructional Choices and their Learning Styles Within a Lesson Framework

Part II: Interview (Qualitative)

Interviewer: Lucille Mazo (researcher, PhD candidate, LM)

Interviewee: (DKW) Participant 11; Case 7 in the EICLS Inventory

Date: May 30, 2014

Interview length of time: 1 hour: 14 minutes: 19 seconds

Location: Maryland, U.S.A.

Mode: Video conferencing (Skype) interview with audio recorder to tape the interview

Kolb's Learning Styles:

C = Convergent

D = Divergent

AS = Assimilation

AC = Accommodation

Statement 1: When I choose content for a lesson, I like to

LM: For inventory statement 1, you chose d) include situations and examples that go beyond theory and apply in different and changing circumstances (Accommodation (AC)). Can you expand, provide insights, or reflections about your response?

DKW: My rationale is that learning is a process and that during that process it is non-linear and it crosses disciplines and different topics. So, I like to have real live situations that create critical thinking and problem solving opportunities that are appropriate to individual student learning needs and their learning outcomes, and their professional goals. So, by having situations and examples that go beyond theory and apply in different and changing circumstances allows me to be very student-centric when I choose content.

Statement 2: When I prepare for my lesson, I like to

LM: For inventory statement 2, you chose a) organize my lesson content around problem-based learning (Convergent (C)).Would you like to expand on that, at all?

DKW: Yes. The goal in the classes that I teach, whether it is critical thinking, non-profit, public policy, public-administration, grant writing, and organization development, that my goal is for a student to walk away with the ability to apply what they learned in their lives the next day. So, if they have situations in models and theories and real-life applications they will be able to become problem-solvers. Really, that relates back to being student-centric in my teaching approach by allowing them to become problem-solving because it is not the content or the information as they can always look that up or they can always research but it is the application, the higher order critical thinking. I chose a) because it was the closest that represented it for me.

Statement 3: When I choose materials for my lesson, I

LM: For inventory statement 3, you selected d) include descriptions of real-time events and circumstances where students can engage in situational thinking and discussion (Accommodation (AC)). Would you like to expand on that, at all?

DKW: I guess it is the subject that I teach that drives this response because I had the advantage in public policy and public administration and non-profit if I mentioned for the other statement a laboratory of the world with my contacts and work with the United Nations with real time political and national debate that is happening in real time; so, that students can then take scholarship, practice, research, and application of problem-solving and being able to engage when situational thinking that that is a multi-dimensional way of thinking. The discussion is a way for them to reflect and to discuss and to collaborate and to be able to understand how what they are learning and their knowledge can be applied to solve problems in the real world. If we are talking about health care or educational or crime or foreign policy, the situation is also place in geographical terms, in cultural terms, in gender, and in many different types of situations that situational thinking is a cross-disciplinary approach in their discussions to find ways of marrying their expertise and knowledge, and prior knowledge to what they are learning and apply it to real events when they can again go to the workplace or when they apply for a job. Being able to demonstrate that expertise.

Statement 4: Before teaching a lesson, I am prepared when I

LM: For inventory statement 4, you selected b) I feel that I have considered all of the content from various perspectives (Divergent (D)). Would you like to expand on that, at all?

DKW: Well, the most challenging part of my teaching adults is to teach them about cognitive bias and all the different types of bias. Not to change their conclusion but to have them look at the same facts from different perspectives. To have a counter argument so that it strengthens and have them understand their conclusion and their understanding by examining both sides. And, being able to take their bias and being subjective and put it on the side, and when I have the ability to show them a different point of view, a different scholar, a different theory; if it is conservative and liberal, if it is a theory vs another, it gives them the ability to understand the content and being able to justify what they are arguing, whether it is a discussion or a paper they are writing.

Statement 5: My approach to teaching a lesson generally focuses on

LM: For inventory statement 5, you selected d) providing opportunities for students to engage in new experiences requiring action (Accommodation (AC)). Would you like to expand on that, at all?

DKW: Yes, the choices are all part of my thinking and my approach, but selecting the opportunities for students to engage in new experiences requiring action is really based on you know an action base approach and it goes with the other questions and why I chose them of being student-cenric of being real-time problem-solving of bringing the real-world into their life. And, learning is what I said earlier is a process and non-linear. It is ongoing. So, in the 21st century, and this was true in the last decade, more in the 90s and in the last 14 years into the 21st century of the speed of knowledge, information, and experiences on social media of instantaneously seeing an event in real time it is real important for students not to be stuck in a historical perspective or one way of thinking but to be able to adapt to the very changing and quick times that their living in but also to be able to have the skills and understanding; to be able to slow down and to critically think and to create the knowledge and the decision making that they need. But they are constantly, whether they work for a company of whether they are teaching (science or math) that they are constantly being face with an exponential growth of knowledge and it is preparing them for the real world and the workplace in the 21st century.

Statement 6: In a lesson, it is important for me to ensure that students

LM: For inventory statement 6, you selected a) experience knowledge through experts in their field (Convergent (C)). Would you like to expand on that, at all?

DKW: I do not know why I did not select b).

LM: Well, maybe you want to. Is there a reflection on that?

DKW: Yeah. And, I thought about that when I went through that question. And, I know that I chose a) because when I chose a), I was thinking that I want them to be able to know who the seminal theorists are and to know who the experts are and

who is credible. And, then for them to come to their own conclusions and they need to have a base of getting facts. And, in order to do that they need to learn how to research and having those skills of finding credible expert reliable knowledge. This comes from being able to identify and understand who the experts are in their field and new theories underline and development of the theory. But, now, in looking at experience and theory by actively applying theories and principles through hands-on exercises that is only possible if they understand and if they know the theories and that is why I went back to a) because they need to know the theory because theory informs practice, theory informs policy, especially public policy.

Statement 7: In a lesson, I interrelate best with students when I

LM: For inventory statement 7, you selected c) listen to their ideas and concepts and their responses to questions (Assimilation (AS)). Would you like to expand on that, at all?

DKW: I guess this comes back to something that I learned and it is a cliché: That if you have two ears that you listen twice. More than you only have mouth then you speak. And, through observing over many, many years professionally and personally, the people that I respect and the people that have the wisdom, research and the expertise, it takes time to read and listen and to think. And, by me being able to hear what my students are saying, that is where the learning is occurring. It is not occurring with me. It is occurring with them. It is the apprentice and the master, where my job as the master (using as a metaphor) is to get the apprentice to exceed what I know. And, my proudest moment is when they are able to come up with AHA moment and they get it. And they say something that is so insightful and adds a whole new perspective. That is what education is. It is not teaching that is dumping information; it is leading them. And, the only way to do that is to listen to them. That is why you are there in the classroom.

Statement 8: In a lesson, I like to create a comfortable learning environment that

LM: For inventory statement 8, you selected b) promotes student interaction and dialogue between each other (Divergent (D)). Would you like to expand on that, at all?

DKW: Well, I was thinking that this is the closest that comes to my thinking of creating a safe learning environment, a trusting learning environment. And, I also believe very strongly in social learning theory. Study after study after study on the brain power of many people is a lot more effective than just one person. The study after study after study of how creativity and ideas is a bond whether it is technology or medicine, comes from marrying an idea from here and an idea from there putting together and merging them through time and space and to

bring together new ideas; a new innovation. And, to be able to create that dialogue is to get them to hear and listen to each other and to create a fellowship and a networking and taking the expertise of another student and their experience that applies to what their goals are in their expertise and having that conversation. And, I teach a lot of military students and I worked for the US Army for 5 years. And, military people, whether they are active or retired, are very regimented and they are taught to follow plans and orders and they have a strict code of ethics. But in the US Army and Military, they are allowed to think individually. And, when individual soldiers are acting or a few individual soldiers acting together and say "Hey! We can do this." And, they go off on an objective during that haze of battle, you want them to realize that the power of knowledge and learning is already within them. The only way that they can know that is to talk to each other and hear that.

Statement 9: When I begin to teach a lesson, I gain my students' attention by

LM: For inventory statement 9, you selected b) waiting until students naturally quiet down and look at me to begin the lesson (Divergent (D)). Would you like to expand on that, at all?

DKW: I am never going to ask adults to quiet down. Good luck with that. I mean that does not work with 2nd graders, Good luck. Also, waiting until student naturally quiet down, that goes back to the prior question because a lot of times when I hear them having a conversation, they will spark off and I will say that is exactly what we are going to do tonight. And, here is our perfect point and I tie it together. So, by me standing and waiting, I am not waiting for them to behave, I am listening to them and hearing their excitement so that I can build off of it. Hearing what is important to them. Hearing the day that they had, the challenges, the stress, new opportunities, new jobs. When the government shut down, I had students that worked at very high level, top secret CIA, high intelligence levels where they said to me: "Oh, we can't say that Dr. W." Oh, I understand. It is very high level clearance. So, by knowing in that moment and hearing them talk, that I can then show what the book says, but in real life when there is a fiscal crisis and the budget shuts down, hearing how they react, gets them more excited and gets them more involved in the lesson. And, it shows respect. I respect that what they have to say is important. So, if I say "okay, it is my turn now", it is not my turn. I want to show them that I respect that what they have to say is very important.

Statement 10: During a lesson, I establish rules in my learning environment by

LM: For inventory statement 10, you selected d) providing real life examples of the rules (Accommodation (AC)). Would you like to expand on that, at all?

DKW: One thing that I have always (and I don't use this word often) hated and totally react to is when someone gives me a rule and does not explain to me why. And, so it is really important that when I am teaching them about plagiarism and APA style is to tell them why it is important and applying it to whether their giving us a speech or writing an executive summary or being given a high level job to do. Because, my students have incredible jobs in government and health and by telling them this is why you are learning this rule like you are learning to stop at a stop sign that it is important because that gives you the opportunity to be safe and procedure. So, by preparing them with why it is valuable, then they go "Ohhh!" So that is why you write an Abstract or why another instructor wanted us to write another Abstract. So that if you make it a rule that we will be able to go on for a masters or we will be able to go on for a PhD. Ohhh! So when I wrote that executive summary that my boss wanted me so that I could think more focused and concisely and be clearer. Ohhh! When I have to speak for only a minute I will be able to do that because I have had all of this practice. That is the thinking behind that.

Statement 11: I outline the content that will be covered during the lesson by

LM: For inventory statement 11, you selected c) posing a key question that will be answered throughout the lesson (Assimilation (AS)). Would you like to expand on that, at all?

DKW: Writing on the board is not teaching or educating. Verbalizing it at the beginning of a lesson; I think that there are best practices that say "write it on the board" "this is what you are going to learn" You say it again. Yeah, well not when students are up at 5 am and they are going to be there until 10 pm. But, what I like to do is to weave the essential questions and to bring them back of how things tie in together and that goes back to that multi-disciplinary approach. And, there are times I felt every class that I go off on tangents, but I will always bring it back to the question to that topic and show you how it ties together. And, this one class I did this: "If I am sitting in this apartment on one afternoon like I was on Saturn". One of my students said. Alright Dr. W. you always said you would tie it back to the essential question, let's see you bring it back home for this one." So, I did. And, he said "Wow, you really earned your PhD." And, I said: "Don't fool the master. I said that I wouldn't say something unless I am able to do it. And, it is important that that models why that confidence understands how I teach. And, I understand how I teach and go off on tangents, but I also have had practice of bringing it back." And, when you bring up butter and guns, they are two completely different things. And, what happened in the Vietnam war, we cannot pay for butter and guns. Butter and guns, why! But, to bring them together oh yeah you can tie those two concepts together. And so students get it. They get it through painting pictures and storytelling. That is why for thousands of years that oral traditions or storytelling of how we learn, it is in our DNA of how we learning through storytelling and why we love to go to

movies and watching and listening to music and reading books and texting each other. We love to hear stories. And, we get engaged in them. So, but you have to weave it around the essential question so that I am meeting their need and their requirement to make that course relevant so that they have learned when they get their degree that this course had relevancy in their learning and their career. So, I just can't be wandering all over the place. It has to be tied to the learning outcomes. I also have to be aware of the inputs

Statement 12: In the lesson, I teach concepts to students by

LM: For inventory statement 12, you selected d) assigning practical exercises for students to experience the concept (Convergent (C)). Would you like to expand on that, at all?

DKW: Well, if you notice, that there is a pattern arising. It's important to … If I am preparing someone going into public policy and public administration. Someone who is already working in government and they do not quite understand public policy and it is just for politicians and congress, and nothing is being done and its special interests and its power, they do not understand the practical reality of the depth of the field that they are in. I have had student after student after student saying: "Wow, I did not realize that this field was so important." They love this field so much more now because they understand how it applies and how the depth and breadth of it, that they can use it when they go and vote and when they see an issue they get to apply this." And, that is why you educate so that you can go out and be prepared. I heard on Charlie Rose which is a talk show: he was speaking to a general and I didn't get the general's name. "You know Charlie, we have a lot of doctrine in the military in the army, but doctrine isn't practicing, Doctrine gives you the general framework, but it is not the answer. You have to go off and explore the realities of all the different things that can happen and be prepared for that." So, you can have the knowledge and the concepts and the conceptual ideas and develop the doctrine in the concept. But if you don't bring it home and make it real it does not prepare them for their professional lives.

Statement 13: In the lesson, I build rapport with students by

LM: For inventory statement 13, you selected c) providing time to reflect on ideas for discussion (Assimilation (AS)). Would you like to expand on that, at all?

DKW: Well, forget about remembering their first names because I have little place cards. I only have 5-6 students in a class so it is not hard. But that does not build a rapport but names are important and eye contact. I mean that it all: e.g. when I drive my car I adjust my mirrors and my seatbelt, but that not how you drive the care. And, walking through the learning environment to see if they require assistance, well that is what you do. I mean that is part of being engaged but

giving time for reflection, I always say before they discuss to reflect. And, now this may be an American culture or maybe it is generational, that everything is done speed, now. If I look at something and it is not there then moving on. To slow down, think and to reflect. The old ancient Greek philosopher (I can't pronounce his name) who said "you can't enter the same river twice." So, when I think about reflection whether it is about an author or the Buddha or Ghandi or Martin Luther King or when I show a video of an expert, each and every one of them said: You know I have been pondering this question for 20 years. You know the last 15 years I have been wondering why this creativity and blah, blah, blah, and why this happens and I have been research on this and I have been in this field all of these years. It is that reflection.

And, so, the emphasis is giving their time to think critically and to reflect. Because the reflection is more important than what they will actually discuss. One time they will go back and they will say: "Ahh, yes, when that question was posed and they will think about it again and they will go home thinking about it and they will start thinking more and more and more. Reflection is a tool for them to think. I will have a student that will say there is no way that I am ever going to recycle. I know that this class is about biosphere and economics and ethics and we are talking about recycling and protecting the biosphere. I live in a rural area and I have to drive all of this way to drop off my recycles. I don't care. It is a tiny little thing. There is no way. It is not going to happen." And, I would say: okay, I respect that but this is week one and we have five weeks in the course. By the third week, "You know Dr. W., I have been thinking about what I can do. Since I have to drive to the grocery store, I can separate my bottles and cans, I can do that. By week five, you know I am so excited I am recycling because they had time to reflect. There are so many times that students will say: "You know, it is black or white; yes or no. That is the way life is. That is the way I think. I have always thought that way. I am going to leave your class thinking that way." I say: Okay fine. But, this is week one and I have five more weeks. Because I give them that change to reflect." Then I hear, "You know, I have been thinking about this black and white, maybe there is a little grey thinking about that. " And, then they come in with a jacket with different colours because they have reflected. If I say nothing else about these questions or give reflection is the key for making the world a better place. If more people stopped and reflected.

Statement 14: In the lesson, I create examples or samples for students to learn from

LM: For inventory statement 14, you selected d) by using real-time situations that are relevant to the lesson (Accommodation (AC)). Would you like to expand on that, at all?

DKW: If I have a student working for Home Depot, that is a do-it-yourself, or they are working for Safeway grocery store chain, or they are working for the government, they are living the theories. They are living what they are learning.

This way is all what I have said to date. By giving them the opportunity to make it relevant. It is the same reason why I just don't give them a rule. I tell them why the rule is important because it is physics. You stop the car going 70 miles an hour, you are going 70 miles an hour. If there is nothing to hold you back, your car will stop. You are still going 70 going into the windshield. That is why. If you make relevant and real, they will get more excited. They will get more passionate. They will love their field more. W.B. Yeats said that education is not the filling of a pail, it is the lighting of a fire. And that by making it real and relevant, you are lighting fires under them.

Statement 15: In the lesson, I provide interactivity in the learning environment through

LM: For inventory statement 15, you selected b) open discussions of various perspectives (Divergent (D)). Would you like to expand on that, at all?

DKW: Well, it is important that they hear different points of view. That they challenge assumptions; that they challenge claims and facts. I even tell them when they challenge me: "No, Dr. W., I don't agree. This is the facts." I say: "Thank you. You can make an instructor cry. I am so proud of you." I don't have the answers and that's why you are here. For you to learn; for you to be able to see the different discussions so that the goal is to problem and you think solution. And you need to discuss, collaborate and come up with a solution. And, that's why you are working as part of your work is part of a learning team. Because, you are learning how to have those open discussions. That is why I don't let you stay on the same learning team because you have been with the same people for the last 3 years and you try (whoa can I work with this person or this person). You are not learning. You are just cutting and pasting. So, you need to have interaction and different perspectives. You need to learn to be respectful. You need to learn to deliver and support everything (theory and perspectives) and not your opinion. Because, no one cares what you think. You need to support it. That only happens through having an interactive learning environment. And the one thing that has killed creativity because I have taught elementary school, is when an elementary teacher says "quiet down, you are talking too much". Like what? How can you talk too much in a classroom? Why would you want a quiet classroom? Now respectful and not attacking school code of ethics, but why would you not want an engaged, passionate, interactive classroom learning environment. That is where all the learning gets done, because someone will say, "I have done this. I have had a $20 million dollar budget. I have had a flight to Afghanistan. This is what supply chain really means. I have brought the supplies from America to Afghanistan and how to go through that." And, they engage with each other and they learn and understand that they would never understand from a textbook. Life does not happen in a book; it does not happen in a classroom. It happens in real life and it is a process. That is what lifelong learning means.

Statement 16: In the lesson, I seek different viewpoints by

LM: For inventory statement 16, you selected c) asking students to reflect on the various options provided and then asking them to critically analyze these options into a cohesive theme or idea (Assimilation (AS)). Would you like to expand on that, at all?

DKW: It has to do with eliminating bias. It has to do with them critically thinking, especially in public policy or public administration. It is important for them to not have the perspective that "I have always done it this way. Or I think I have always thought this way. Or, when we are talking about Obama Care, I stopped in saying: this is a public policy course. There is no public policy or law called Obama Care. You need to understand that it is the "Affordable Care Act" and there are different options. And, that you need not only look at what you heard or read, but you need to actually go into the law (whether it is 1000 or 10,000 pages) and consider all of the options and then come up with a solution, a recommendation based on theory and practice and model that. If you were a consultant and you were a policy analyst and the President called you into the office, he wants options. And, so, on preparing them, that is the real world. People who are running companies and businesses and governments, they want their subordinates their consultants to give then options and opportunities. So, it's just giving them practice of what they are learning in reading and then applying it in that conversation. And, to be truthful, they do not do any of the reading. But, I trick them by talking about the reading through these discussion. So they say "Oh wait a minute, I kind of remember that. And they rush to their laptop and they open up the book chapter and they say: "Oh wow!" and, you see their face go "I didn't know this chapter said this. This is so great" So, you know, I know how to lead a horse to water and get them to drink. You have to get them thirsty enough.

Statement 17: I review after a lesson by

LM: For inventory statement 17, you selected c) reflecting on the general delivery of the lesson to ensure its approach was logical and precise (Assimilation (AS)) Would you like to expand on that, at all?

DKW: I learnt a long time ago when I sold textbooks. A social studies teacher said: I don't want to buy your history textbook because I have been teaching from McGregor/McGruder book since the last 16 years and I have all my notes and all my lesson plans. Why would I buy a new textbook and have to redo all of that. So, it is really important for me to think that how can I do this. I am not always going to get the same students as every classroom is dynamic and different personality. So, in the next week, remember when we talked about this and see how it applies this and this is how that concept applies to this concept. And, knowing how I delivered it, I don't want to say the same thing in the same way. I want to know how that thread when I go off on a tangent, how do I weave all

this together so it is a cohesive lesson. Like I write children's stories and books and people like plays and movies, and you build up and you do character development and you build up the plot and you come to a climax. You can have two climaxes in a story and then you come down to a conclusion. That is how I am looking at the delivery. I just saw a special a couple of hours ago and the songwriters on Fiddler on the Roof said: "

How do we convince an audience that after the first act of the play it ends in a pogrom. Russian Cossacks come in and destroy the wedding. And then after the second act of the play, they are forced out of their stettle and they have to leave and that is the reality of it. My grandparents were forced out of their stettle, they were forced into the Pale. They were forced out. You have to give a play a musical where at the end of the first act there is a destruction of the wedding and then they are forced from their village. Yeah. How do you delivery that? And when the songwriter said: "No, it is about this Jewish thing. And the producer said no, and he kept on asking questions. Finally, the songwriter said. "it is about tradition, Fiddler on the Roof. The producer said, that's it!" That is the connection. That is how you are going to deliver that. That is why I chose this response. Did I get that connection to them (students).

Statement 18: I make changes to the lesson by

LM: For inventory statement 18, you selected b) rereading the narrative samples and stories to ensure that they provide relevant and meaningful connections with the lesson content (Divergent (D)). Would you like to expand on that, at all?

DKW: Well, there is more than one answer that I could have easily selected.

LM: Can you tell me which one other than that that you selected?

DKW: All of them are really relevant and they are all part of the same. My thinking was that learning is being non-linear and multi-disciplinary, and social learning and group learning, because that is how I think, that that lesson is not over when I leave at the end of the class. And it is not over at the end of the course. And I want to make sure that when I am going into the next week and the learning objectives, that I am looking to see if what they read has that base that foundational prior knowledge, that I can build on to bring the next week's content. So I am building a house for them with different parts. And there are times when I will show them or provide them a different way through a story or problem. You know what they said in class, I should have shown this video and I will be able to tie things together, like making a quilt. Oh. I left that patch out. And by reading what we discussed in the stories it helps me to think if I am missing anything or is there a better way of telling this. Because I do not know until I actually have the interaction of the students; whether those stories and narratives really work. If I am teaching leadership, I show them a short Popeye lessons of leadership or Dancing Guy. They are different narratives, one is a cartoon and one is a Youtube, and they are different ways of learning. So, it is

not just that they are reading, but different learning styles. Narratives are not just in a book, off a paper, etc. It is through discussions, through their own narratives, through their own discussions, through our dialogue, through TED.

Statement 19: In research content for the next lesson by

LM: For inventory statement 19, you selected c) identifying new theories that explain a concept (Assimilation (AS)). Would you like to expand on that, at all?

DKW: So, when I was taking my masters, started in 1997, so this is a while back; and the chair of the department was teaching a class on international relations theories (I was getting my masters on international relations as a step towards creating my foundation and I was not quite sure what that would look like, but I knew that I needed to know about international relations. She was going through all of these theories and I said: Why am I learning theories? What do theories have to do with what I am doing in real life? What does theory ever have to do with learning?

And, she responded, wise old professor that she is, she responded by saying I am giving you a tool box and all of these theories are different tools. So, when you look at a problem or an issue or whatever needs to be resolved, you will say: "oh, I have that tool in my theory tool kit that I can pull out and help understand what this is all about, and that the evolution of this theory or where other theories come from. Eg. People so misquote Maslow. I think that he is the most misquoted famous theorist, probably next to Dewey. Maslow and that pyramid. He never said that you go from these stages. He said over and over again that you go through more than one stage at the same time. You can be actualized and slip down to basic needs. I mean I am living proof of that. So, it is important as if you are building a home on that you not only need the architectural plans, the theories, the models, but to know which one of how I am going to put that wall up; or that plumbing in because they are different tools to understand that. I might need more than one tool to get a very good understanding so that I can be informed to come up with a policy, a solution. Now I am talking about the social sciences. Those science people are so practical and their level of rationality and thinking critically is so multi-layered and rational. It amazes me; it just puts me in awe. But, in the social sciences you cannot be sloppy in your scientific method. You just cannot be as precise. But, the theories need to be borrowed from different disciplines. So that is why I focused on that.

Statement 20: In organize the next lesson by

LM: For inventory statement 20, you selected d) ensuring that there is an activity for students to begin with that applies the previous lesson's concept with the next lesson's learning (Accommodation (AC)). Would you like to expand on that, at all?

DKW: Because, it is not going to come from my scope and sequence, or from my syllabus, or from my textbook. It's going to come out of fresh learning and new ideas. I have to be conscience and listen and being able to tie all of those things together. Each class is dynamic and differ and if I am doing it in notes and reviewing. Well b) is important too, logical and sequential, but those are just things that are part of what you do. But it is important for them to tie it all together.

I know because of University of Phoenix and other universities that in America, there is a really strong emphasis on preparing students for the workplace. Like that didn't happen in the 20th century. It did but to prepare students for critical thinking and analytical and writing skills and all of that. That if I can tie it together. So that at the end of five weeks, that each student walks away thinking that the course met their individual specific needs. I have done that over and over again.

Sometimes I do not even know how it happens. It happens so organically. But it seems to happen over and over and over again. And when students reflect in the last week and if it is an online class and it is 8 weeks, I hear them saying: "Oh yeah, I was able to see how important it is for critical thinking or whatever that topic was. Or when we talked about this, how it applied. When you are teaching them the importance of looking at and critically thinking in week two and in week eight they are going "ohh, now I get it" because it was reinforced and reinforced and tied together, why Dr. W. said that. Now I see how it was woven together.

Then why don't they write better papers, if they know all of this.

LM: Would you describe what you think your learning style is?

DKW: I know what my learning style is. I am an extremely visual learner. I cannot hear without seeing. If someone is lecturing to me, I am more challenged than when I am reading. I listen differently then how I am visually. Because communication is not just listening or tactile. It is all of those things. But I learn best when it is visual. I learn best when I am able to actually get hands on and do it. Show me. Let me do it and make a mistake. I learn best by making mistakes and being given the opportunity to do it again and again. And to know why I made the mistake. And to be able to experiment. That pretty much is my learning style.

LM: Do you want to add anything as to how you have taken your learning style and placed it into your teaching? Do you see what effect your learning style has in how you apply it to your teaching? Any insights on that?

DKW: I have had teachers who did not recognize my learning style or understand that my being so verbal was a way of my creativity and the ability to make mistakes and actually do and touch was critical. Either was right or wrong. I also taught elementary school and this was reinforced so I needed to learn learning styles.

My personal learning style is that it is more sensitive and tolerant of other students' learning styles. I can see and recognize them. I understand that introverted does not mean that they are quiet, because everybody has a degree of introversion and extraversion.

In one of my classes there was a student saying that another student has not said one word in class for 3 years. I had the student talking within one minute of the first class and by the end of the course talking all of the time, because I recognized his learning style. Not imposing my learning style that he was not verbal. He was extremely bright and by looking at him and how he was learning, teachers did not look at me and how I was learning, he was listening intently. His body language indicated that he was listening and thinking. You see the intelligence in his eyes. He came from an African nation so I knew the culture was different and that he was a different ethnicity than the instructor. So you create opportunities for students to shine through their learning style.

So, knowing my learning style and understanding how I learn, I understand that learning is done in many different ways. So, I know that I have to touch, I have to hear, I mostly have to see. So that whenever if give a lesson, I have them touch, get up , move, watching videos, listening to music. A lot of different ways. So that all of the learning styles are imposed on them. And I also let them knowing that learning styles are the way that the key word is not style but learning; that you learn through mistakes. I give them permission and create a safe learning environment for them to learn through mistakes. So, eg. A student will say that there is no way that if will present in front of a class. You can fail me; I do not care. I ask if the student is comfortable siting at your chair and speaking. Yes that is fine. The fear was speaking. Another fear was what that student knew and was afraid. I kept my distance during this interaction. When the trust was established, then you can move and go through.

Being sensitive on how I react to students makes me a better instructor. My teachers in my early education did not do that for me.

Extra comments:

This study is important, because some instructors did not go through the educational pedagogy and that they are expert in the field but they do not know how to teach. If you ask them a question outside of their discipline, they do not know.

I know that it is extremely important for university instructors to be able to understand not adult learning theory, but to understand how they frame and express to their students and how they teach and the choices that they make as professors and you hear feedback from students. They know when you do not care about them, when you do not embrace their learning styles and all that we have discussed and it is so important for instructors at the university level to really understand the pedagogy.

You may even further this because I think that it is brilliant. To express this beyond the dissertation. This is something that has a real social impact on how people come out, that students come out within their discipline and instructors need to be self-aware.

Appendix M: EICLS Inventory—Development, Delivery, and Debriefing of a Lesson

(Questions 1-20)— Educators' Learning Styles Choices

The following series of tables provide a detailed record of each educators learning

styles choices as they related to the three groups of questions in the EICLS Inventory

(Mazo, 2008): 1) Development, 2) Delivery, and 3) Debriefing of a lesson.

Table M1

EICLS Inventory, Educators' Learning Style Choices During "Development of a Lesson"

EICLS Inventory – Development of a Lesson (Questions 1-4) – Learning Styles			
Case Number	Q1	Q2	Q3	Q4
1	convergent	accommodation	convergent	accommodation
2	convergent	assimilation	accommodation	assimilation
3	accommodation	assimilation	accommodation	assimilation
4	accommodation	accommodation	divergent	accommodation
5	accommodation	assimilation	convergent	assimilation
6	divergent	assimilation	accommodation	convergent
7	accommodation	convergent	accommodation	divergent
8	accommodation	accommodation	divergent	accommodation
9	accommodation	accommodation	assimilation	assimilation
10	accommodation	convergent	divergent	divergent
11	divergent	assimilation	convergent	assimilation
12	accommodation	accommodation	accommodation	assimilation
13	accommodation	accommodation	assimilation	divergent
14	divergent	assimilation	assimilation	divergent
15	divergent	assimilation	convergent	divergent
16	accommodation	accommodation	divergent	accommodation
17	accommodation	convergent	accommodation	divergent
18	divergent	convergent	convergent	assimilation
19	divergent	accommodation	convergent	accommodation
20	assimilation	divergent	accommodation	assimilation
21	no response	no response	no response	assimilation

(table continues)

22	accommodation	no response	assimilation	assimilation
23	accommodation	accommodation	assimilation	assimilation
24	no response	assimilation	accommodation	divergent
25	convergent	accommodation	accommodation	accommodation
26	divergent	convergent	accommodation	assimilation
27	divergent	assimilation	accommodation	assimilation
28	accommodation	accommodation	convergent	divergent
29	accommodation	accommodation	accommodation	assimilation
30	accommodation	convergent	accommodation	divergent
31	accommodation	accommodation	convergent	divergent
32	divergent	divergent	accommodation	divergent
33	accommodation	assimilation	accommodation	divergent
34	convergent	divergent	convergent	convergent
35	accommodation	convergent	convergent	accommodation
36	accommodation	accommodation	convergent	divergent
37	convergent	accommodation	divergent	accommodation
38	convergent	convergent	divergent	divergent

Table M2

EICLS Inventory, Educators' Learning Style Choices During "Delivery of a Lesson"

	EICLS Inventory – Delivery of a Lesson (Questions 5-8) – Learning Styles			
Case Number	Q5	Q6	Q7	Q8
1	convergent	accommodation	accommodation	convergent
2	convergent	accommodation	assimilation	accommodation
3	assimilation	accommodation	assimilation	divergent
4	accommodation	accommodation	accommodation	accommodation
5	convergent	assimilation	accommodation	assimilation
6	assimilation	accommodation	accommodation	assimilation
7	accommodation	convergent	assimilation	divergent
8	accommodation	convergent	convergent	accommodation
9	convergent	accommodation	convergent	convergent
10	convergent	convergent	assimilation	divergent
11	assimilation	accommodation	accommodation	convergent
12	convergent	convergent	accommodation	convergent
13	accommodation	accommodation	accommodation	divergent
14	convergent	accommodation	assimilation	divergent
15	accommodation	accommodation	assimilation	divergent
16	accommodation	accommodation	assimilation	divergent
17	convergent	accommodation	convergent	convergent
18	convergent	accommodation	accommodation	assimilation
19	convergent	accommodation	convergent	convergent
20	assimilation	convergent	divergent	convergent
21	accommodation	convergent	accommodation	convergent
22	assimilation	assimilation	accommodation	convergent
23	accommodation	convergent	assimilation	convergent
24	divergent	accommodation	assimilation	divergent
25	accommodation	accommodation	convergent	convergent
26	divergent	accommodation	accommodation	divergent
27	assimilation	convergent	assimilation	divergent
28	convergent	accommodation	accommodation	convergent
29	accommodation	accommodation	assimilation	convergent
30	convergent	convergent	convergent	convergent
31	accommodation	accommodation	convergent	divergent

(table continues)

32	convergent	convergent	convergent	divergent
33	accommodation	convergent	divergent	accommodation
34	No Response	No Response	No Response	No Response
35	accommodation	accommodation	accommodation	divergent
36	accommodation	convergent	assimilation	divergent
37	divergent	assimilation	convergent	accommodation
38	accommodation	accommodation	divergent	convergent

Table M3

EICLS Inventory, Educators' Learning Style Choices During "Delivery of a Lesson"

EICLS Inventory – Delivery of a Lesson (Questions 9-12) – Learning Styles			
Case Number	Q9	Q10	Q11	Q12
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1	accommodation	convergent	divergent	accommodation
2	assimilation	convergent	divergent	convergent
3	assimilation	assimilation	assimilation	accommodation
4	accommodation	assimilation	accommodation	accommodation
5	divergent	assimilation	divergent	accommodation
6	accommodation	divergent	accommodation	accommodation
7	divergent	accommodation	assimilation	accommodation
8	accommodation	divergent	convergent	assimilation
9	assimilation	accommodation	accommodation	convergent
10	convergent	divergent	convergent	convergent
11	assimilation	accommodation	assimilation	accommodation
12	assimilation	accommodation	convergent	accommodation
13	assimilation	No Response	convergent	convergent
14	accommodation	accommodation	divergent	accommodation
15	assimilation	assimilation	accommodation	accommodation
16	assimilation	accommodation	accommodation	accommodation
17	No Response	No Response	No Response	accommodation
18	assimilation	No Response	convergent	convergent
19	accommodation	convergent	convergent	convergent
20	assimilation	accommodation	assimilation	divergent
21	No Response	accommodation	No Response	No Response
22	accommodation	accommodation	divergent	assimilation
23	assimilation	accommodation	convergent	convergent
24	assimilation	assimilation	accommodation	No Response
25	accommodation	accommodation	divergent	convergent
26	divergent	accommodation	convergent	assimilation
27	convergent	divergent	accommodation	accommodation
28	assimilation	accommodation	convergent	accommodation
29	accommodation	convergent	divergent	accommodation
30	accommodation	accommodation	accommodation	convergent
31	accommodation	assimilation	divergent	convergent

(table continues)

32	accommodation	convergent	divergent	convergent
33	accommodation	accommodation	assimilation	assimilation
34	No Response	No Response	No Response	No Response
35	convergent	assimilation	convergent	divergent
36	convergent	accommodation	convergent	accommodation
37	accommodation	No Response	accommodation	accommodation
38	accommodation	convergent	convergent	accommodation

Table M4

EICLS Inventory, Educators' Learning Style Choices During "Delivery of a Lesson"

EICLS Inventory – Development of a Lesson (Questions 13-16) – Learning Styles			
Case Number	Q13	Q14	Q15	Q16
1	accommodation	divergent	divergent	assimilation
2	accommodation	convergent	convergent	assimilation
3	divergent	divergent	assimilation	divergent
4	accommodation	assimilation	convergent	divergent
5	convergent	divergent	divergent	assimilation
6	convergent	accommodation	convergent	divergent
7	assimilation	accommodation	divergent	assimilation
8	divergent	assimilation	convergent	accommodation
9	assimilation	divergent	accommodation	divergent
10	divergent	convergent	divergent	assimilation
11	convergent	divergent	divergent	divergent
12	assimilation	divergent	accommodation	divergent
13	convergent	assimilation	convergent	assimilation
14	accommodation	accommodation	convergent	assimilation
15	convergent	divergent	convergent	divergent
16	assimilation	accommodation	divergent	assimilation
17	No Response	divergent	divergent	assimilation
18	divergent	accommodation	divergent	assimilation
19	convergent	convergent	convergent	divergent
20	divergent	assimilation	divergent	convergent
21	No Response	No Response	No Response	No Response
22	convergent	divergent	divergent	convergent
23	divergent	assimilation	accommodation	assimilation
24	No Response	convergent	divergent	assimilation
25	accommodation	accommodation	divergent	divergent
26	convergent	divergent	assimilation	divergent
27	convergent	divergent	convergent	assimilation
28	convergent	divergent	divergent	convergent
29	convergent	assimilation	accommodation	accommodation
30	accommodation	divergent	divergent	assimilation
31	accommodation	divergent	accommodation	assimilation

(table continues)

32	divergent	divergent	divergent	convergent
33	divergent	divergent	convergent	assimilation
34	No Response	No Response	No Response	No Response
35	accommodation	convergent	divergent	assimilation
36	assimilation	convergent	convergent	assimilation
37	accommodation	divergent	convergent	divergent
38	accommodation	divergent	convergent	divergent

Table M5

EICLS Inventory, Educators' Learning Style Choices During "Debriefing of a Lesson"

EICLS Inventory – Debriefing of a Lesson (Questions 17-20) – Learning Styles			
Case Number	**Q17**	**Q18**	**Q19**	**Q20**
1	accommodation	assimilation	divergent	assimilation
2	convergent	accommodation	convergent	convergent
3	divergent	accommodation	divergent	assimilation
4	divergent	accommodation	accommodation	divergent
5	assimilation	divergent	convergent	assimilation
6	assimilation	accommodation	accommodation	accommodation
7	assimilation	divergent	assimilation	accommodation
8	convergent	divergent	divergent	accommodation
9	assimilation	assimilation	convergent	assimilation
10	convergent	accommodation	convergent	convergent
11	assimilation	assimilation	accommodation	divergent
12	assimilation	convergent	accommodation	assimilation
13	assimilation	accommodation	accommodation	assimilation
14	assimilation	accommodation	accommodation	accommodation
15	divergent	convergent	divergent	assimilation
16	accommodation	divergent	accommodation	accommodation
17	assimilation	accommodation	accommodation	accommodation
18	divergent	accommodation	convergent	assimilation
19	assimilation	accommodation	divergent	assimilation
20	assimilation	convergent	divergent	divergent
21	No Response	No Response	No Response	No Response
22	assimilation	accommodation	accommodation	assimilation
23	assimilation	accommodation	divergent	assimilation
24	convergent	divergent	No Response	accommodation
25	assimilation	accommodation	accommodation	accommodation
26	No Response	convergent	convergent	divergent
27	divergent	convergent	convergent	assimilation
28	divergent	convergent	convergent	convergent
29	assimilation	accommodation	divergent	assimilation
30	convergent	convergent	accommodation	convergent
31	convergent	convergent	convergent	assimilation

(table continues)

32	divergent	convergent	convergent	assimilation
33	divergent	accommodation	convergent	assimilation
34	No Response	No Response	No Response	No Response
35	No Response	No Response	No Response	No Response
36	divergent	assimilation	assimilation	convergent
37	convergent	convergent	accommodation	assimilation
38	accommodation	accommodation	divergent	assimilation

Appendix N: Descriptive Statistics of Sample

Using statistical software, relevant descriptive statistics were generated and

organized for the purpose of analysis. Included below are descriptive statistics that

characterized the sample: range, mean, standard deviation, and variance.

Variable	Range	Mean	Std. Deviation	Variance
Q1:choose content	4	3.08	1.282	1.642
Q2: prepare lesson	4	3.00	1.252	1.568
Q3: choose materials	4	2.71	1.334	1.779
Q4: ready for lesson	3	2.74	.860	.740
Q5: approach to teaching	4	2.68	1.378	1.898
Q6: students' experiences	4	3.00	1.414	2.000
Q7: interrelate with students	4	2.84	1.220	1.488
Q8: learning environment	4	2.03	1.127	1.270
Q9: gain student attention	4	3.26	1.083	1.172
Q10: establish rules in environment	4	3.26	1.288	1.659
Q11: outline content	4	2.53	1.370	1.878
Q12: teach concepts	4	3.00	1.433	2.054
Q13: build rapport with students	4	2.68	1.416	2.006
Q14: create examples/samples	4	2.47	1.109	1.229
Q15: provide interactivity	4	2.13	1.189	1.415
Q16: different viewpoints	4	2.63	.942	.888
Q17: review after a lesson	4	2.68	1.188	1.411
Q18: make changes to lesson	4	2.92	1.402	1.967
Q19: research for next lesson	4	2.71	1.450	2.103
Q20: organize next lesson	4	3.00	1.090	1.189
Develop a Lesson Activity	3	3.24	.998	.996
Deliver a Lesson Activity	4	2.71	1.431	2.049
Debrief a Lesson Activity	4	2.61	1.264	1.597